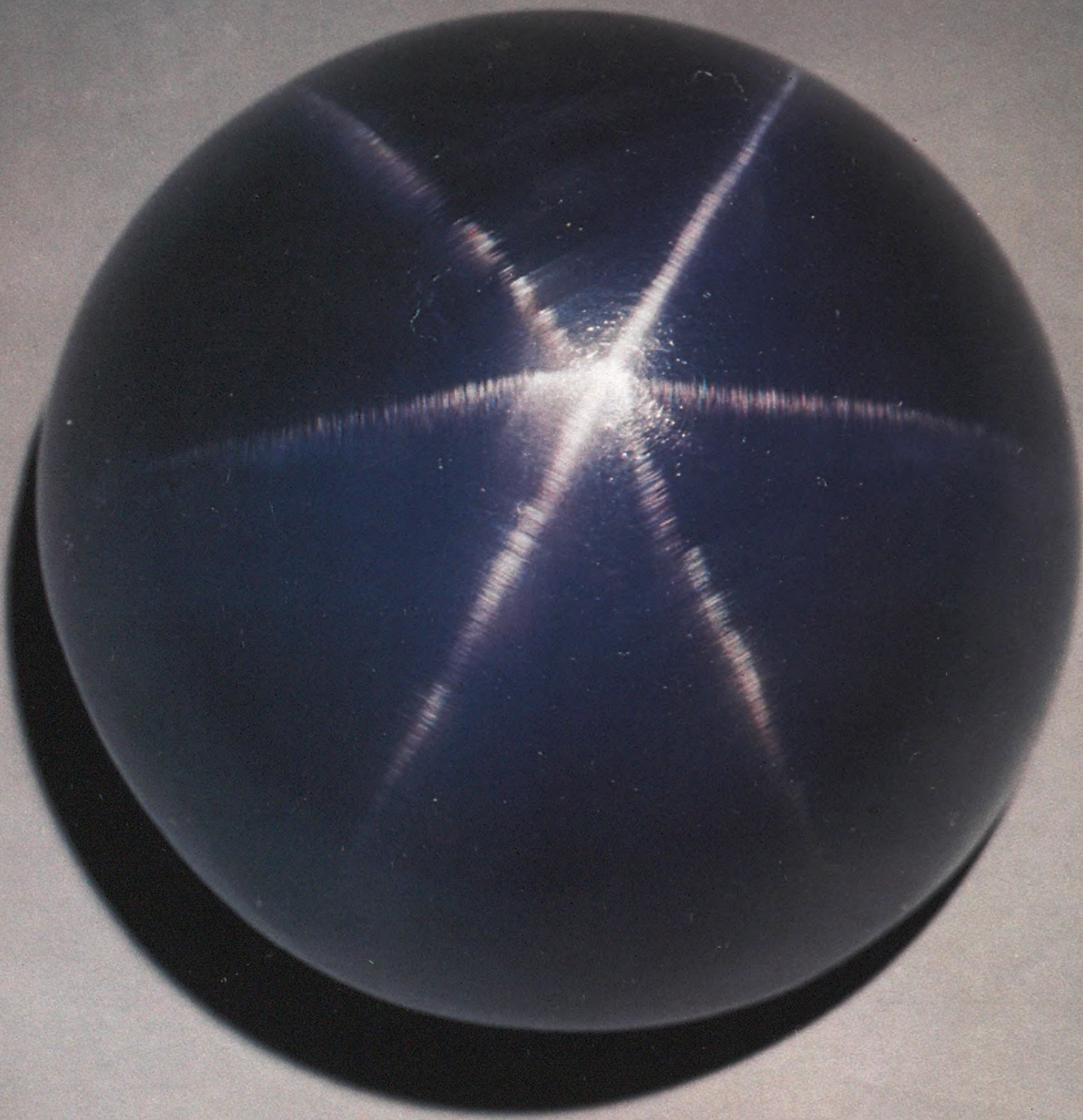
September 1971

Smithsonian



Star of Asia sapphire in the Smithsonian collection,
a 330-carat treasure. Enlarged five times (See page 44)

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September 1971

Smithsonian

Volume 2, Number 6

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Letters to the Editor

Szent-Györgyi

Dear Sir: If certain of Albert Szent-Györgyi's statements in your article, "A Nobel scientist's gloomy outlook," are valid, then the efforts of the citizens of Seattle to purify their lake (same issue) make no sense. Neither does the care taken by the National Collection of Fine Arts to preserve its beautiful works of art, nor the cheerful scholarliness of Isaac Asimov, nor the article on shore life which concludes that even wreckage on the beach is "not a relic of despair."

Szent-Györgyi says that "we are all criminals," that "crazy idiots . . . run the world," and speaks of "a rejection of the whole world as it is—all of it."

Yet he declares himself to be happy, and his work continues through the generosity of private supporters. He pursues his hopeful research, seeking to save lives by developing a cure for cancer. (But who shall cure a cancer of the spirit?)

How many young people will read that last paragraph in the article and believe it? Do we need still more whining dropouts, drug addicts, illegitimate children and venereal disease?

Mrs. W. P. Armstrong
St. Louis, Missouri

Dear Sir: I want to thank Szent-Györgyi for his inspiring phrase: "the dignity of endeavor." Truly, the doing's the thing.

Frank J. Duff
San Francisco, California

Soldier songs

Dear Sir: Your article, "Soldier songs have been stirring but they also reflected war's grimness," in the July issue brought back some nostalgic memories. As a small boy I remember hearing the song,"Kingdom Coming", sung by male members of my family. They were not Union veterans but of the generation following.

In addition to the verses you printed, there is another quatrain that I remember well:

> He drilled so much they called him
> Cap'n,
> An' he got so dreadful tan, we spec'
> He'll try to fool de Yankees
> For to tink he's contraban'.

The reference to "contraban' " is the designation of Negroes as contraband of war during the Civil War.

Carl V. Wisner jr.
Fort Lauderdale, Florida

Dear Sir: In your article on soldier songs, I disagree with your version of William Billings' song, "Chester." The version I have been acquainted with was first written as a hymn in 1770 and during the American Revolution converted to a war anthem in 1778. Some of the verses in the song are as follows:

> Let tyrants shake their iron rod,
> And slavery clank her galling chains;
> We fear them not, we trust in God—
> New England's God forever reigns.
>
> Howe and Burgoyne and Clinton, too,
> With Prescott and Cornwallis join'd,
> Together plot our overthrow,
> In one infernal league combin'd.
>
> When God inspir'd us for the fight,
> Their ranks were broke, their lines were
> forc'd;
> Their ships were shatter'd in our sight,
> Or swiftly driven from our coast.
>
> The foe comes on with haughty stride;
> Our troops advance with martial noise;
> Their veterans flee before our youth
> And generals yield to beardless boys.
>
> What grateful offering shall we bring?
> What shall we render to the Lord?
> Loud hallelujahs let us sing,
> And praise His name on every chord.

The William Billings is the same man of whom you speak, for the William Billings I know of was blind in one eye and short in one leg. I feel you have made a mistake.

Paula Bradstreet
Gloucester, Massachusetts

Miss Bradstreet is correct. The song we quoted was *by William Billings but its name is "Retrospect."* Ed.

Dear Sir: I noted in your article on soldier songs that Joseph Webster's famed Civil War camp song, "Lorena," originated in Chicago. It is true that it was published in Chicago, but it was composed in Elkhorn, Wisconsin, in 1857.

As a curator of the Webster House Museum, I thought you might be interested to know that the Walworth County Historical Society has restored the musician's home and opened it to the public.

Helen Kluge
Elkhorn, Wisconsin

Wildflowers

Dear Sir: I was born in the mountains of North Carolina, and your article on wildflowers reminded me of my childhood there. However, you missed one of the most precious and rarest of flowers—the arbutus. It is the state flower of Massachusetts, but it is called by its other name, the Mayflower. Arbutus was even mentioned in *Bulfinch's Mythology*.

I have seen and picked most of the flowers shown in your article. Your photographer, Francis M. Greenwell, had such beautiful photographs of these flowers that I just wanted to remind him that he missed the best one.

It also has another special meaning for me—it is my first name.

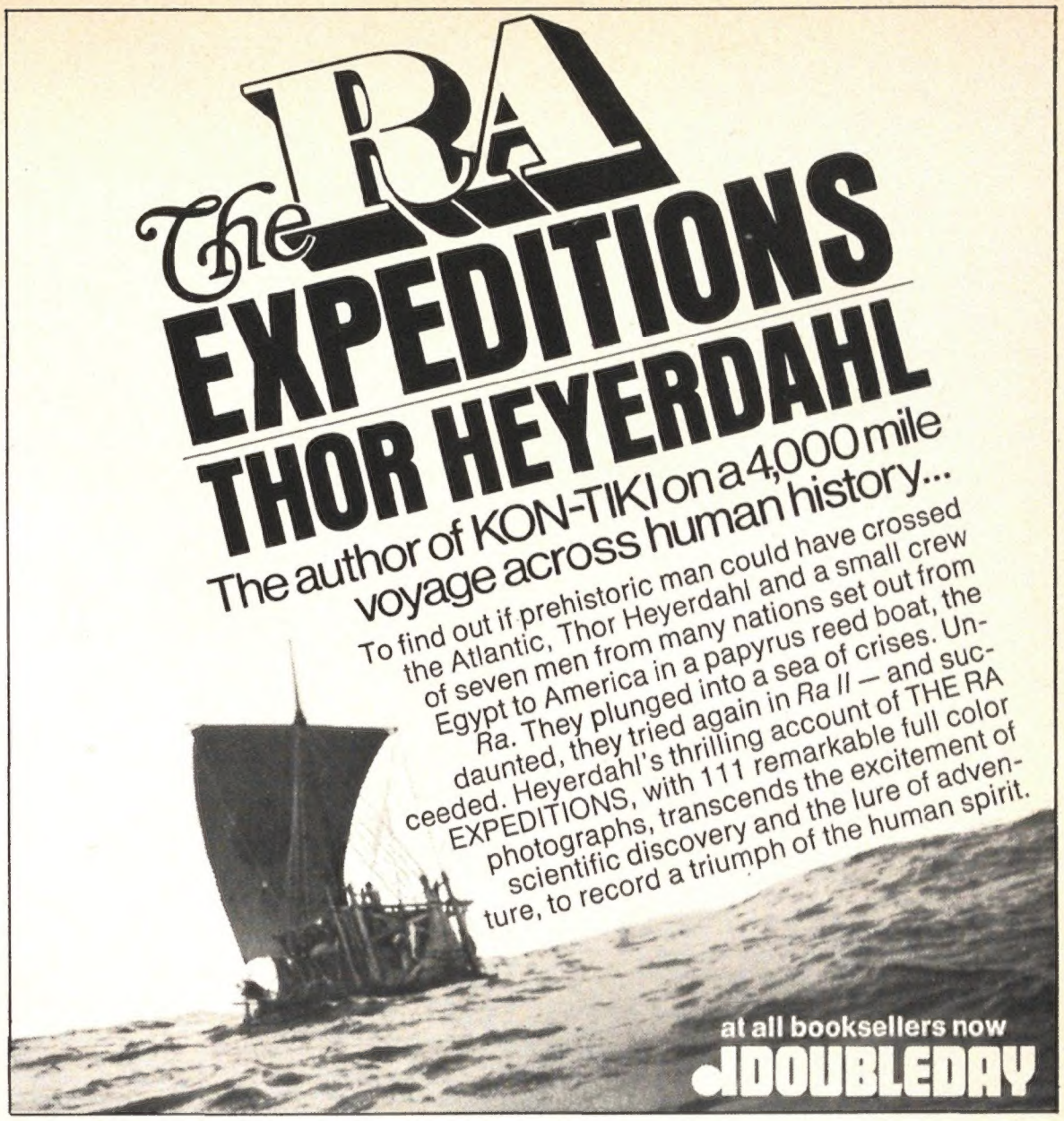
Arbutus M. James
Memphis, Tennessee

Mr. Greenwell does not have a picture of the arbutus but, when it blooms in the spring, he plans to photograph it for his collection. Ed.

Greenwell's quarry

St. Michael

Dear Sir: The figure on the medallion shown on page 21 of your July issue is identified as St. Michael. Is not the dragon-killer with a red cross on his shield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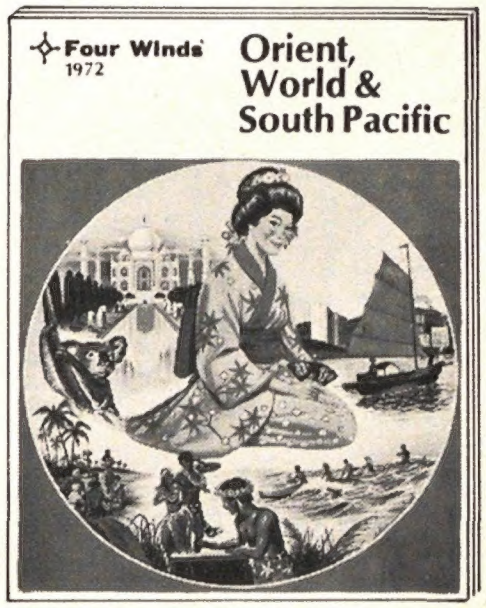

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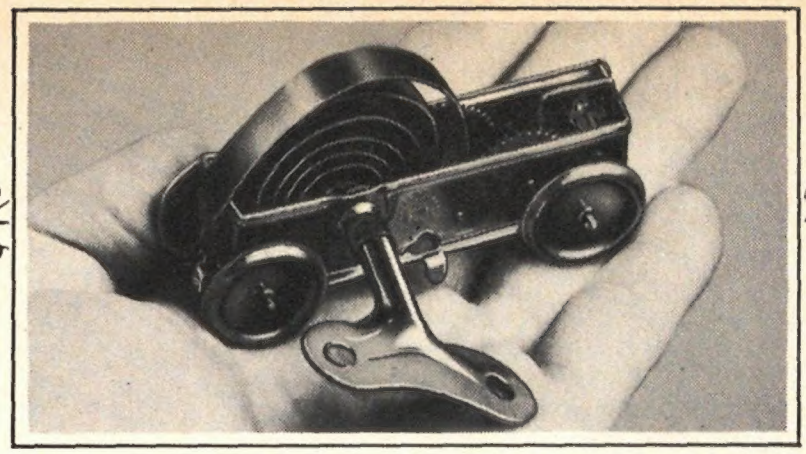
St. George? I believe St. Michael's cross is white on a blue field.
John G. Rogers
San Francisco, California
Both St. George and St. Michael are depicted in Christian art as dragon-killers (in St. Michael's case, the dragon represents Satan). But only St. Michael, as an archangel, is given wings. It is true that St. George is usually represented with a red cross, but not always—note the blown-glass relief on the same page. Ed.

Hummingbirds

Dear Sir: Your issue for July has a magnificent series of pictures of the courtship of hummingbirds, but I have my own theory that the female—the "coquette"—is only *playing* hard-to-get.

Examine the photographs carefully. In the first of the series of pictures, the female bird looks over her shoulder in exaggerated disdain (the first move of a coquette). In the second, she moves over slightly, at the same time indicates indifference to the male's advances. Notice her feathers fanned out to attract him! This, in spite of her cold shoulder. She changes places on the branch in the third picture—evidently leaving him for a moment to whet his interest. In the next picture, she rejects a too-precipitous advance but, in sliding out of the way, lifts her breast feathers—a veritable *can-can*—as if by mistake. What a coquette. The male now is sure of his conquest. The last picture shows him cuddled up, sleeping with his mate.
Mrs. James Mann jr.
Norfolk, Virginia



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Secretary Ripley's comments

The view from the castle

Our anniversaries, past and present,
allow us to touch base again
with the ideals of our Institution

Twenty-five years ago the Smithsonian celebrated its centennial. The original Act of Congress establishing the Institution was signed by President James K. Polk on August 10, 1846. On August 10, 1946, President Harry S Truman congratulated the Institution and called for a renewal of effort ". . . toward the end that Man should not only know better his earthly abode, but should acquire the means of knowing himself better." The President went on to remark, "Such studies are of vital significance in our present efforts to build a better world order, and to break the cycle of recurring wars of ever-increasing destructiveness."

The Smithsonian has not been able to help break that cycle, but it has, a quarter of a century later, helped to establish within its walls the Woodrow Wilson International Center for Scholars which I discussed in SMITHSONIAN last March. Here, scholars are working on historical analyses of international developments of many kinds, including recent foreign policy studies. Subsequently, too, the Institution has played host to a National Armed Forces Museum Advisory Board, whose charter includes the mandate to study the origins of war and peace.

On August 10, 1946, the Post Office Department presented to the Secretary, Dr. Alexander Wetmore, a commemorative 100th-Anniversary stamp showing the exterior of the Castle. Alas, *o tempora, o mores,* the stamp would take a first-class letter anywhere in our country for only three cents.

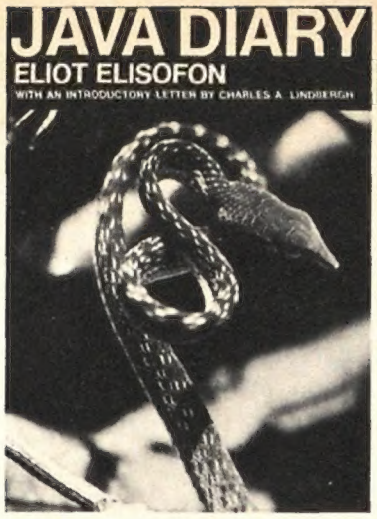
The 100th anniversary of our first Regents' meeting was also celebrated in 1946, but not at the same time. In 1939, John E. Graf, then associate director of the U.S. National Museum, had noted that "Washington reaches its lowest level in August and it would be extremely difficult . . . to have proper attendance of well-known men." So it was decided to hold the centennial meeting in October 1946 in the Natural History Building.

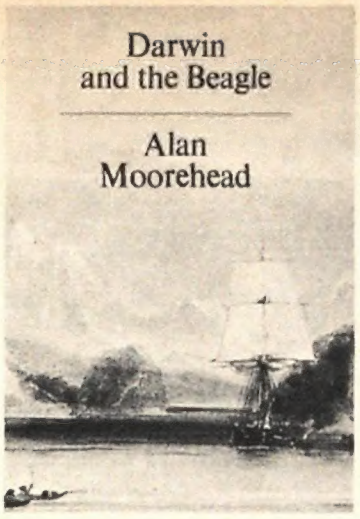
A proposal for a Smithsonian flag died aborning, not to be revived until 1965—the celebration of the 200th anniversary of James Smithson's birth. A proposed Smithsonian "Honor" and "Smithsonian Medal" with engrossed scroll and ribbon never saw the light of day. The ribbon was to be worn in the manner of the French Legion of Honor. *Vanitas vanitatum,* perhaps the expense of such things precluded the creation of a Smithsonian Award of Merit.

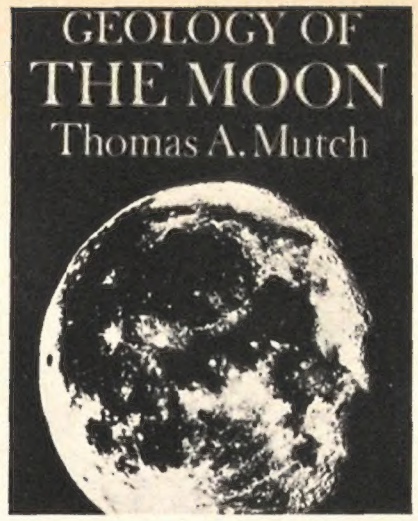
The reception in the rotunda of the museum, where now the African elephant holds court, cost one dollar per person to the caterer and $150 for decorations, prices which made the three-cent stamp look a little bit high for the time. The Marine Band was free.

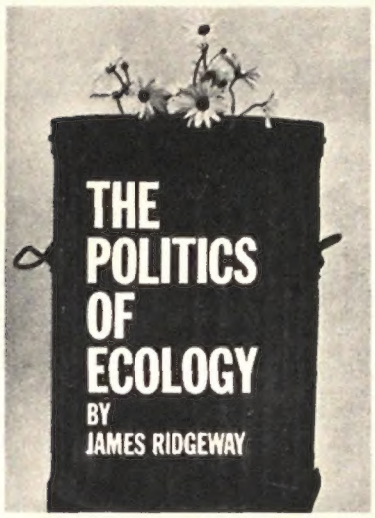
This month under the presiding genius of the Chancellor, Chief Justice Warren E. Burger, the Smithsonian will celebrate its 125th Anniversary with modest demeanor and budget. Music there will be and an address or two, and a reception for the Establishment, the Regents, the National Associates Board and others. We honor our founder in this way—and our government and other friends who honor us with their support. Each generation should be reminded of the Smithsonian's record in attempting "to know better [Man's] earthly abode."

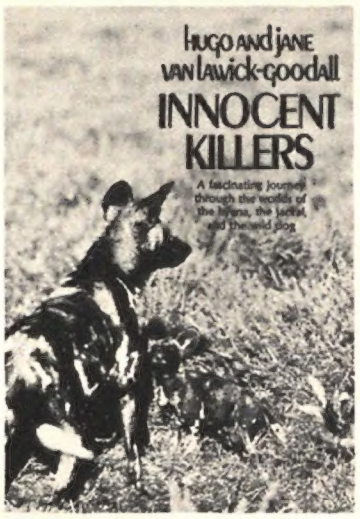
S. Dillon Ripley

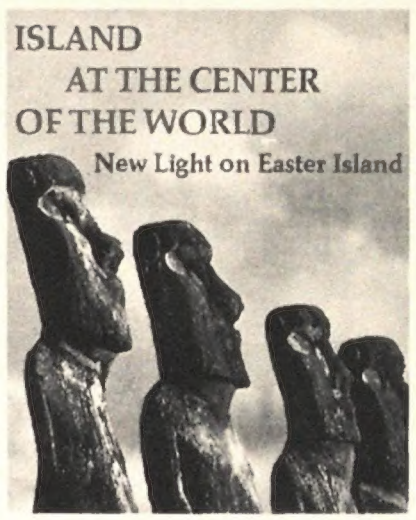












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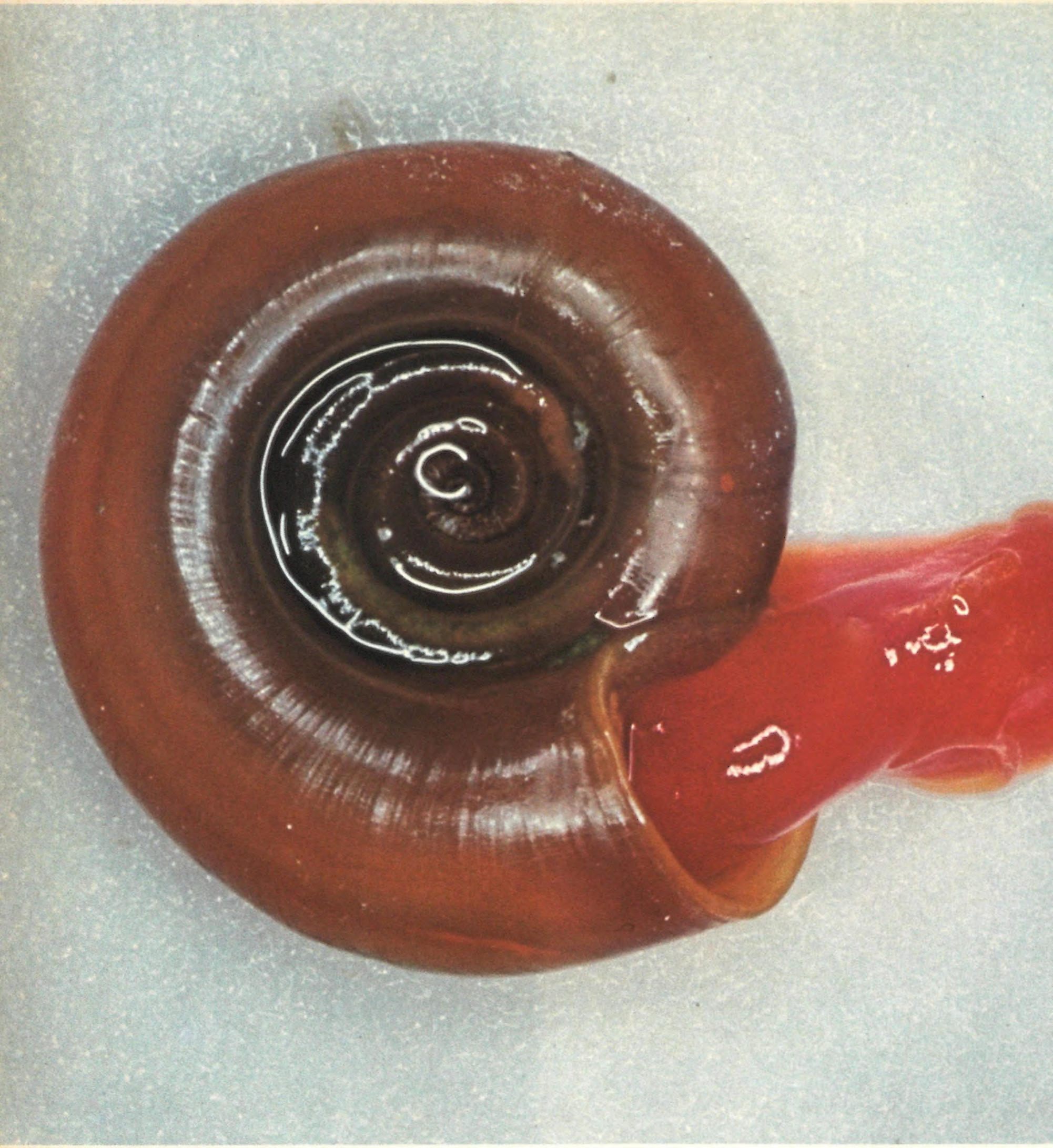

Shown about 25 times life-size, the larva of a marsh fly *(Tetanocera ferruginea)* sinks its mouth hooks into a snail *(Australorbis glabratus)*, the primary host of schistosomiasis in the western hemisphere's tropics.

By Clifford O. Berg

The fly that eats the snail that spreads disease

Controlling pests by using their natural enemies instead of chemical pesticides is possible but often difficult, as seen in the case of snail fever

A mosquito-infested marsh in Alaska is not the first place anyone would look for a method of controlling a parasitic disease that is ravaging the tropics. But that was not what I was looking for back in 1950 when I stumbled onto a discovery that has dominated my research interests since then and recently involved me in the Smithsonian Institution's efforts to find biological controls of the rapidly spreading disease called schistosomiasis (see box, page 11).

There is an increasing demand for biological control of pests as we learn more about the unfortunate effects of chemical control methods. Of some 225 control programs for insect pests, by purposefully introduced parasites and predators, 66 were completely successful, 88 substantially so, and 71 partly successful.

In 1950, as consultant entomologist with the Arctic Health Research Center in Anchorage, I was dipping for mosquito larvae in the tundra pools, rearing and identifying them and reporting on where and when insecticides should be applied for maximum control with minimum contamination of the environment. Strange-looking larvae I couldn't identify often appeared in the dipper with the mosquito wrigglers. I kept them alive in laboratory finger bowls, driven by a biologist's compulsion to identify and probe the

Dr. Clifford O. Berg is professor of entomology at Cornell University. During the past year he carried on his research on biological control as part of the Smithsonian's Ecology Program.

The author, here in Australia, has traveled through much of the world collecting marsh flies.

secrets of any of the animals or plants he doesn't know.

Leaving for dinner one evening, I dropped a healthy, vigorous snail into a bowl containing six of the unknown larvae. When I returned about an hour later, the snail was dead and half-eaten. Four larvae were crowded side-by-side in the shell, their front ends deeply embedded in the snail's body. Their sharply toothed mouth hooks slashed away rhythmically at the soft snail tissues. The next morning the six engorged larvae lay satiated and quiet. The snail shell was as clean inside as a museum specimen.

I reared three distinct species among the larvae reared the first summer in Alaska. All were efficient snail killers, and this, evidently, was their only food.

When the first adult emerged I finally learned the identity of these tundra snail killers. They were Sciomyzidae, or marsh flies as members of this family are commonly called. Widely known inhabitants of marshes, swamps and pond borders, more than a hundred species have been described in North America. There are probably 600 species throughout the world —on all continents and in climates ranging from Alaska's tundra to the tropics.

The adult flies range from half to more than twice the size of a housefly and most species are colored in shades of brown or gray. Their antennae are long and erect and they sit head downward with a froglike tilt of the body, resting on vegetation. This is where they mate and lay their eggs. They are not attracted to man or domestic animals, to man's food or dwellings and they are very seldom seen outside of the marshes where their larvae live.

I was fascinated by the ease with which their complete life cycles could be observed and impressed by the potential importance of these insects for biological control. Parasitologists have long sought better methods of snail control, because snails transmit important parasitic diseases to man and domestic animals.

A library search produced no indication that anyone else had seen a marsh fly larva kill a snail, but there were reports that adults of a few European species had been reared from puparia found in the shells of land snails. By concentrating on land snails during my second summer in Alaska, I learned that the terrestrial sciomyzid larvae live intimately associated with a snail for several days before killing it.

I published the first of a series of papers on the Sciomyzidae in 1953, hypothesizing that all larvae in the entire family are snail killers and suggesting that Sciomyzidae might be useful in the biological control of dangerous snails. To test that hypothesis, I tried to rear every species of marsh fly I could collect alive.

Moving to Cornell University that same year, I began to suggest research problems on the marsh flies to some excellent graduate students, and we now have studied the life cycles and biology of 200 species. We

The Smithsonian's part in snail fever research

Schistosomiasis is a long and, for many, unfamiliar name for a scourge that is more and more familiar in the tropical parts of the world. A disease that passes from man to man only through the intercession of certain kinds of snails, its rapid increase in recent years is, ironically, due in large part to man's most generous impulses.

Assistance to developing countries has typically meant building dams and irrigation complexes. The snails which play temporary host to the schistosomiasis organism best thrive in such standing waters.

The disease has always been with us. For example, Dr. David Challinor, assistant secretary for science at the Smithsonian, recalls flying over Africa's Lake Victoria and being startled by long stretches of unpopulated shoreline. "There were no villages or other signs of human habitation. The high incidence of schistosomes along the shore had undoubtedly limited human settlement."

Now, because of human intervention, there are more infested areas than ever. The disease has no known medical treatment without its own serious side effects, nor is there an economically feasible means of chemical control of the snails. Until recently there has been little concerted effort anywhere in the world to control it.

Indeed, before it can be controlled, a great deal of basic research must be done, and this is the vacuum which, a little over a year ago, the Smithsonian decided to help fill.

Under the direction of Dr. Dale W. Jenkins, the Smithsonian's Ecology Program has mounted a many-pronged attack on schistosomiasis as part of its biological control efforts. Dr. Berg has spent the last year at the Smithsonian in work on marsh flies, and these studies, among others, will be continued this year by Dr. Lloyd Knutson. Meanwhile, other biological studies on snails are under way on the Mekong River in Thailand.

A book is being prepared that will describe all of the potentially useful parasites and predators of snails. Other control techniques are being explored: for example, aquatic weed control (many of the snails live on weeds) and better methods of water-level management.

Finally, the Smithsonian Institution is planning an international conference for 1972 that will convene recognized specialists to consider all possible methods of control and, in cooperation with the United Nations and various national and private organizations, to plan a continuing program of research and field application.

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have been especially interested in the tropical species since man's worst problems with snails are found in the tropics.

Snails play a critical role in the complex and precise cycle of diseases caused by parasitic flatworms known as flukes. All fluke parasites of mammals and birds are transmitted from one warm-blooded host to another by snails. Eggs of these flukes hatch into tiny, ciliated larvae (called miracidia) whose survival depends upon finding a particular species of snail within 24 hours. If successful, they enter the snail's body and develop there. From four to ten weeks after a miracidium has entered, the snail begins to shed many thousands of microscopic free-swimming larvae.

Depending on the species of fluke involved, their function is either to find the right warm-blooded animal and penetrate it, or to place themselves so that the animal is apt to swallow them. Inside the body of their final host, they grow into adult worms (flukes) and each one lays up to 3,500 eggs a day for several years.

The most serious fluke disease of man is schistosomiasis (also called bilharzia or snail fever), a chronic, debilitating ailment that is becoming more common in the world at a time when many diseases are responding to control measures. Caused by blood flukes living in the veins of man's mesenteries, intestines and bladder, it afflicts an estimated 200 million people in warmer parts of the globe. This figure does not include the unknown number of victims in mainland China where, James Reston of the *New York Times* reported recently, it has ravaged populations in the Yangtze Valley. (There the problem is exacerbated by the use of human excrement for fertilizer; efforts to treat the night soil, killing the parasites before using it, have been successful in some localities.) In any event, Chairman Mao Tse-tung was so moved by the seriousness of the disease that he wrote a poem, urging his people to work harder to stamp out the scourge. Referring to Hua To, a famous physician, Mao's "Farewell to the God of Plague" begins:

Green streams, blue hills—but all to what avail?
This tiny germ left even Hua To powerless;
Weeds choked hundreds of villages, men wasted away;
Thousands of households dwindled, phantoms sang with glee....

The construction of new dams in tropical and subtropical countries is largely responsible for the increase of snail fever. Some of the worst snail hosts of schistosomiasis thrive only in stagnant water; they all thrive better in habitats that remain moist throughout the year. Wherever a river is dammed, flowing water that provided no acceptable habitat for some important snail host species is converted into a stagnant-water

In sequence, a voracious marsh fly larva *(Elgiva rufa)* approaches a host of schistosomiasis, attacks it and pursues it into the shell where the larva dines on snail flesh. Later, below,

reservoir for many miles above the dam. Below the dam perennial irrigation suddenly transforms the agricultural practice to year-round farming. And it provides snails with a habitat in which year-round reproduction causes geometric increases in their population, and their potential to transmit fluke disease.

People do not have to eat uncooked food to get schistosome parasites—just swim, wade or dip their hands into water in which a snail host is releasing infective larvae. Two or three weeks later, a dermatitis and an itching rash may develop, followed by fevers, aches and other symptoms of toxemia. Later many patients have recurring diarrhea or dysentery, increasing abdominal pain and enlargement of the liver and spleen. The abdomen gets bloated while the rest of the body becomes anemic and emaciated.

Although many patients can endure the disease for years, their ability to work is severely impaired. For this reason, schistosomiasis is one of the world's leading cripplers of economic growth. The World Health Organization recently labeled it the most important disease retarding the development of tropical and subtropical countries. Even more serious in many countries is fascioliasis or "liver rot" of sheep, cattle and man, a disease caused by a larger fluke that lodges in the bile ducts. Infected animals become abnormally lean and weak; death may follow either from direct effects of the disease or from complications arising from it.

In our Gulf Coast states this parasite causes an estimated annual loss of 44 tons of condemned livers and 58 tons of meat, great reduction in milk production and the deaths of many cattle, especially calves. But infection rates of 100 percent in some dairy herds in the Peruvian valleys are not so shocking as rates up to 42 percent in school children. The *Fasciola* larva must be swallowed—it does not penetrate the skin.

Parasitologists have realized for years that this complex life cycle, demanding constant alternation between vertebrate and snail hosts, provides the key to control of diseases caused by flukes. Adult flukes do not move from one vertebrate host to another. The transmission of schistosomiasis directly from man to man would be virtually impossible—even by a blood transfusion.

There is no transmission of snail fever anywhere within the United States, despite the fact that visitors and immigrants from Africa, the Far East, South America and other tropical regions are releasing viable eggs every day. If all snails of the host species could be eliminated in the worst endemic areas of schistosomiasis, transmission there would stop.

Chemical pesticides known as molluscicides have been used in many areas. Some of these poisons are extremely effective in killing snails and snail eggs, but they also destroy aquatic insects and other invertebrates, fish and even aquatic weeds. I know of no molluscicide that can be certified as safe for all freshwater organisms except snails. Molluscicide application thus involves the same problems as the use of insecticides, herbicides and other potent pesticides.

Another limitation of molluscicides impressed me during a recent visit to Volta Lake in Ghana, where schistosomiasis is a growing problem. I stood on the

the larva (whose meal can be seen through its transparent skin) leaves the snail dying,

its blood diffusing into the water. A larva takes about a half hour to kill a snail.

A Central American marsh fly *(Sepedon macropus)* has recently been pressed into service in Hawaii.

deck of a boat near the dam that created that colossal body of water, trying to imagine the extent of its tortuous 4,000-mile shoreline. It was obvious that the periodic application of molluscicides is impossible there: The cost alone would be prohibitive.

The answer may be biological control and the effective agent of control may be a marsh fly. All really promising agents of biological control act more or less specifically on the pest species or the group of animals to which the pest belongs and do not attack desirable species. Marsh-fly larvae, for example, have greater specificity of action than any molluscicide now in use.

Another advantage of biological control is the low overall cost. This does not mean that the study, pre-release testing, mass rearing, release and post-release appraisal of a potential agent of biological control is a quick, simple matter. But once completed, a successful biological control operation is permanent. It results in a self-perpetuating population of the enemy.

The first real opportunity to try out marsh flies came in a letter from the state entomologist of Hawaii, asking if we had a sciomyzid larva that could kill the snail host of the giant liver fluke of cattle.

This immediately raised a series of bothersome questions. (1) Will sciomyzid larvae from the American mainland recognize a Hawaiian snail as something good to eat? (2) If so, will they thrive on the one that transmits liver fluke and develop into healthy, vigorous adults capable of laying many eggs? (3) Will they prove harmless to such desirable species as the beautiful tree snails of Hawaii and the predatory snails introduced there to control another pest, the giant African snail? (4) If released in Hawaii, will they become established in nature as self-perpetuating populations? (5) Will they continue to attack the liver-fluke host snail in natural situations, where snails of other species are equally accessible to them? (6) If so, will they destroy enough snails to reduce appreciably the transmission rate of fascioliasis? Success in biological control would demand affirmative answers to all of these questions. The first negative answer would terminate the experiment.

Selecting a suitable species

Fortunately, my students and I had just returned from collecting trips to Puerto Rico and Central America, and we had laboratory colonies of nine tropical species of Sciomyzidae. We compared the larvae for size and aggressiveness, apparent taste for the snail genus *Lymnaea,* and the average number of snails killed per larva. We considered whether a species breeds continually or has seasonal interruptions and computed the average fecundity and average time required to run through the life cycle for each species.

Otherwise emaciated, these Philippine victims of snail fever have the typical bloated abdomen.

We chose *Sepedon macropus,* a colorful species collected in Nicaraguan marshes that seemed similar ecologically to the snail-breeding sites in Hawaii. We sent about 60 larvae of this species to Honolulu by air mail.

Thanks to some good work by the Hawaiian entomologists, we now have affirmative answers to the first five questions. This Central American fly is established in nature on the four major islands of Hawaii and is killing the liver-fluke host snail. Some believe that the rates of fascioliasis transmission also have been reduced, but they have no hard, objective evidence to support that.

Hawaiian entomologists call attention to a recent decline in the percentage of infected cattle livers found in the slaughter houses on Kauai, but the downward dip could be just a normal fluctuation in the population. The fact that fly larvae are found in the act of killing the pest species does not necessarily imply any reduction of snail populations. Some environmental factor that was operative before the flies were introduced may still be holding the population at the same level. For example, if those snails are held in check by limitations of their food supply, the killing of some snails by larvae could mean only that less of them are now dying from starvation.

To obtain more convincing evidence of reduced snail populations, some biologists have urged us to make a careful snail population count in a valley not yet inhabited by the fly, introduce the fly, allow time for whatever effect it will have and then take another census. That might be worthwhile if proof that the snail population has been depressed by 20, 40 or 60 percent were very meaningful. But who knows how much the transmission rate of the parasite is reduced because the snail population is lower?

Dr. J. C. Boray, a veterinary parasitologist with whom I worked in Australia in 1961, has presented evidence that almost all of the sheep-liver-fluke disease there is being transmitted by only a few of the very oldest and largest snails in each habitat. If he is right,

sciomyzid larvae that feed selectively on the tenderest, youngest snails could eliminate more than 90 percent of the snail population without any appreciable effect on the fluke transmission rate. On the other hand, larval selection of the big, old snails could eliminate 90 percent of the disease transmission without any significant decline in snail densities.

Even if there has been some decrease in transmission rates in Hawaii, we clearly have not yet accomplished our objective there. We won't feel we have unless those rates can be lowered so much that the effectiveness of the introduced flies is apparent to everyone concerned. In fact, it seems unrealistic to expect success from the minimal efforts we have made there.

All of the larvae sent to Hawaii were the progeny of two female flies collected in the same region. The population composed exclusively of their progeny probably lacks much of the normal adaptive power of *Sepedon macropus,* because many of the genes normally present in the species are lacking in this inbred stock. To give this species a fair trial, living flies from regions such as Peru, Trinidad, Mexico and Jamaica should be sent to Hawaii for crossbreeding and genetic rejuvenation. I sent them some *Sepedon macropus* from Venezuela in April 1971, but the results of that cross-fertilization are not yet evident.

We should also introduce another sciomyzid into Hawaii. The Hawaiian snail that is the host of the liver fluke leaves the water readily and spends considerable time on the shore. During that time, these snails are relatively safe from the aquatic larvae of *Sepedon macropus.* It is important to keep a target species under pressure at all times; to put the liver-fluke host in jeopardy on land as well as in water, we should introduce a species with terrestrial larvae.

Furthermore, no one knows that *Sepedon macropus* is the best-qualified aquatic predator for the mission in Hawaii. Even if we made the best choice possible at the time, we chose from a very limited group of species. As long as only one-third of the Sciomyzidae of the world have been reared, we will have only one chance in three of selecting the species best qualified for any assignment. So, while cooperating on practical problems that may establish a marsh fly's role as a biological control agent, we must continue our efforts to raise and study those 400 unreared species.

The life cycle of schistosome flukes (or flatworms) is seen as the disease passes from man to child. The disease organisms require a period as parasites of snails which thrive best in standing waters. Marsh fly's life cycle, right to lower left, includes the larval stage so deadly to certain snails.

Nancy Hallam by Charles Willson Peale (1771) as Imogen in Shakespeare's *Cymbeline,* portrayed as she emerges from a cave dressed as a boy (Act III).

Colonial Williamsburg Collection

By Monroe H. Fabian

An all-star stage troupe, cast by the Portrait Gallery

An exhibition saluting the Kennedy Center reminds us that Americans have always been out front when the curtain goes up

Jenny Lind, replica of an 1846 life portrait by Eduard Magnus. The "Swedish Nightingale" was a sensation during the 18 months she spent here.

National Portrait Gallery, London

In 1886 that most revered of American actors, Edwin Booth, (page 21), testified to the power of the image over the written word: "In my study . . . I have often sat until dawn, alternately reading memoirs of the great actors of the past, and contemplating their portraits and death-masks which hang upon the walls; and somehow I seem to derive a more satisfactory idea of their capabilities from their counterfeit presentments than from the written records of their lives."

Most people seem to agree with Booth (hence the popularity of fan magazines); to evoke even a memory of the ephemeral art of the performer we need tangible things, "portraits and death-masks," photographs and memorabilia. And so the National Portrait Gallery in Washington is opening on September 11 an exhibition entitled "Portraits of the American Stage: 1771-1971" as a salute to the inaugural season of the John F. Kennedy Center for the Performing Arts. It documents the professional careers of almost a hundred actors, singers, dancers and musicians whose talents have added chapters (or sometimes footnotes) to a 200-year history of the performing arts in America.

Actually, the history is longer than that. What is now Texas saw a theatrical presentation as early as 1598, something called *Coloquio de la nueva conversión y bautismo de los quatro últimos reyes de Tlaxcala en la Nueva España* ("Colloquy on the Recent Conversion and Baptism of the Four Last Kings of Tlaxcala in New Spain").

English-speaking America saw its first drama, the somewhat more succinctly titled *The Bear and the Cub,* on the Eastern Shore of Virginia in 1665 (it was an amateur production). The first performance in a building specifically built as a theater took place in Williamsburg, in the same colony, in 1718. And the first professional troupe of performers was organized in Philadelphia in 1749, although it was promptly kicked out of town by the Quaker-dominated city council. (They obviously did not share the urbane attitudes of the Church-of-England colonists farther south.) Boston's Puritan ethic was also unreceptive to people of the stage. New York, Annapolis, Williamsburg and—much to the chagrin of the Quakers—Southwark, just over the city line from Philadelphia, became the principal theater towns in America.

But pictorial material from the first two centuries of the performing arts in America is exceedingly rare. Aside from a small handful of prints, there is nothing until 1771—when Charles Willson Peale exhibited his portrait of the lovely young actress Nancy Hallam (opposite), America's first matinee idol. There is no record of where or when she was born—presumably it was in England in the second quarter of the century—or died. But there is ample record to show that she was the

Mr. Fabian is associate curator of the National Portrait Gallery and organized this exhibition.

The Phillips Collection

Otis Skinner by George Luks (1919). On stage for 58 years, Skinner was one of the last of the American actors trained in the 19th-century tradition.

The Library of Congress

first of many players on the American stage to attract a loyal following. Peale painted her after a visit to Annapolis in 1770; when she returned in 1771, the portrait was ready—so that both the real actress and her "counterfeit" were available for comparison. Visitors to the National Portrait Gallery's show may be able to see some of the later stars in person during the opening weeks of the Kennedy Center's first season.

That a number of such portraits was painted soon after that of Nancy Hallam indicates the growing importance of leisure in the years following the rigors of the Revolution. There is John Durang, born in 1786—singer, puppeteer, tightrope walker and, above all, the first native-born professional dancer in the United States. He painted six self-portraits before he died in 1822.

He is followed by the Canadian William Burke Wood and the Englishmen, George Frederick Cooke and Edmund Kean—all actors. From the very beginning our theaters have played host to visitors from abroad, and this internationalism has been pointed up in the exhibition by not limiting it to native-born or naturalized performers.

Jenny Lind (page 19) is a case in point. She was 29 years old, with a successful European operatic career behind her, when she agreed to appear in America under the management of P. T. Barnum. Her debut was prepared with all the masterful showmanship that Barnum could muster; as soon as she appeared on the dock at New York on the first Sunday in September 1850, a wave of mass hysteria began to roll before she had ever sung a note. To heighten the excitement, Barnum had hit upon the idea of auctioning off tickets to the first concert in each city where she would appear. In New York a hatter named Genin—who just happened to be a friend of Barnum—won the first ticket for $225. Philadelphia and Providence buyers were

Geraldine Farrar by F. A. von Kaulbach (1904). Queen of the Metropolitan for 20 years, she went on to the movies and retired at 40 as she always said she would.

Edwin Booth as Iago by Thomas Hicks (1863). Somber by nature, he excelled in somber roles; in 1864 he enjoyed an unprecedented 100-night run as Hamlet.

National Portrait Gallery

Isadora Duncan by John Sloan (1911). Like Martha Graham, Isadora was one of the great American innovators of the 20th century—and Sloan knew it.

Milwaukee Art Center

later to shame him by paying $625 and $650 (in 1850!).

The great age of grandiose drama in America is recalled with portraits of four of the brightest stars of the American stage at that time—Edwin Forrest, Charlotte Cushman, Edwin Booth and Joseph Jefferson. Edwin Booth was the fourth son of an acting family and accompanied his father, Junius Brutus Booth, on theatrical tours from a very early date. The burdensome responsibility of his father's increasingly erratic behavior forced on him a grave and melancholy temperament that was never to leave him, and was compounded when his younger brother John Wilkes Booth assassinated Abraham Lincoln. Joseph Jefferson (page 23) came from a theatrical family, too. As Rip Van Winkle he become a national institution, touring the country annually in the role from 1866 on, even though he later referred to these endless performances as a "theatrical swindle."

A number of great conductors and singers join the actors in the National Portrait Gallery's all-star cast. The conductors are Anton Seidl, who waged a one-man campaign to introduce the music dramas of Richard Wagner to New York; John Philip Sousa, whose efforts made the march band respectable enough to sit on the concert stage; Arturo Toscanini, Leopold Stokowski and Leonard Bernstein.

The singers include Enrico Caruso, Adelina Patti and Geraldine Farrar (page 20), the soprano from Melrose, Massachusetts, whose loyal following of young girl fans was called "gerryflappers" by the press (they went into hysterics as readily as the teenyboppers of a later era).

Isadora was all *womanhood*

That pioneer of modern dance, Isadora Duncan, is present in a portrait by John Sloan (page 22), who —as quoted in *John Sloan's New York Scene*—wrote in his diary: "Isadora as she appears on that big simple stage seems like *all* womanhood—she looms big as the mother of the race. A heavy, solid figure, large columnar legs, a solid high belly, breasts not too full, and her head seems to be no more important than it should to give the body the chief place. In one of the dances she was absolutely nude save for a thin gauze drapery hanging from the shoulders. In none was she much clothed, simple filmy coverings usually with a loin cloth."

Tallulah Bankhead (page 24), Katharine Cornell, the Lunts, Benny Goodman (page 24), Artur Rubinstein, Helen Hayes and Ethel Merman, depicted as Annie Oakley in *Annie Get Your Gun* in a portrait painted expressly for this exhibition (page 25), Joan Baez and the late Jimi Hendrix bring this visual history of the American stage close to our own times.

The Players, New York

Joseph Jefferson by John Singer Sargent (1891)—
a painting of our folksiest actor, famous as
Rip Van Winkle, by our most elegant portraitist.

Collection of the Artist

Regina Resnick as the fiendish
Klytämnestra in Richard Strauss'
Elektra by Arbit Blatas (1969).

Benny Goodman

Benny Goodman by René Bouché (1960). The "King of Swing" is also a superb classical clarinetist, admired for his performances of Mozart and Bartók.

National Portrait Gallery

Tallulah Bankhead in Arthur Wimperis' *He's Mine,* by Augustus John in London (1930) before she became a star in America.

Kathryn Productions

Zero Mostel as John in Ionesco's *Rhinoceros* (1960). Mostel, artist as well as actor, painted himself at the moment when he is turning into a rhinoceros.

Ethel Merman in *Annie Get Your Gun* by Rosemarie Sloat (1971). Commissioned for this exhibition, the portrait shows Miss Merman in a favorite role.

Collection of the Artist

By Isaac Asimov

How the Greeks' element, water, turned into H_2O

The ancients knew that water turned into air, and alchemists knew it could turn into plants, but what was water itself made of?

The journey from the Greek element "water" to today's familiar chemical notation, H_2O, was a long one in both time and thought. Along the way, various chemical theories were aired, and indeed the chemical nature of air itself had to be pieced together (SMITHSONIAN, July 1971). And once the compound nature of *water* was known it became possible, among other things, to develop the modern atomic theory.

The Greeks, who also had their own version of the atomic theory, believed that earth, air, water and fire were the fundamental components of the universe. But these four elements were not necessarily independent substances.

The Greek philosopher Plato (427-347 B.C.) says so in his dialogue, *Timaeus:* ". . . Water . . . when melted and dispersed, passes into vapor and air. Air again, when inflamed, becomes fire; and again fire, when condensed and extinguished, passes once more into the form of air; and once more, air, when collected and condensed, produces cloud and mist, and from these, when still more compressed, comes flowing water, and from water comes earth and stones once more. . . ."

Assuming the elements to be interconvertible, the Greeks wondered if one of them were more important than the rest; were three of them only varieties of the fundamental fourth? Or was there some still more basic substance of which all four elements were only varieties? Philosophers could argue indefinitely over such matters but, without performing precise experiments, they could come to no conclusion. The first to attempt really to test was a Flemish alchemist, Jan Baptista van Helmont (1579-1644).

About 1620, he began by transplanting the shoot of a young willow tree into a large bucket of soil. He weighed the willow tree and the soil separately and carefully kept the soil covered so that no materials could fall into the bucket and confuse the manner in which changes of weight took place. If the growing plant did obtain its substance from the soil it grew in (as seemed reasonable at first blush), it would follow that the soil ought to lose weight as the plant gained.

Naturally, Van Helmont had to water the willow or it would have died. For five years, he watered this tree with rainwater. It grew and flourished and at the end of the time, he carefully removed it from the bucket, knocked the soil from its roots and weighed it. In five years of growing, the willow tree had added 164 pounds to its weight. The soil had lost only two ounces.

Van Helmont deduced that the willow tree had obtained its substance from the water since that was all he had added to the plant-soil system. It seemed proof —experimental proof—that water could turn into the earthy substance of plant tissue, and Van Helmont was convinced thereby that water was the basic element and the primal substance of the universe.

Van Helmont was, however, at the end of an era. Within a generation of his death, new notions of elements were rising. Beginning with the English chemist Robert Boyle (1627-1691), the attitude developed that an element was identified not by deduction but by experiment. Something that could not be further simplified was an element. From that standpoint, earth

In the third of a series (earth and air have been explored earlier), Isaac Asimov plunges into water and the rise of the modern atomic theory.

Since earth can turn into fire, and water comes
from thin air (and then turns into air again),
a Greek would properly ask which element is basic.

Drawings by John Huehnergarth

was not a single element but a mixture of elements.

The statement that water could be turned into earth took on a new kind of meaning in the new chemistry. Into which elements of earth could water be turned? And which was the simpler and therefore truly an element, the water or the particular earthy element into which it had turned? Nevertheless, many chemists clung to the old views. By 1770, when 17 different solid materials were already recognized as so many different elements, and when different gases were on the point of being recognized as elements—some still held to the old notions and maintained that water could be converted into earth. They agreed, however, with the concept of experimental evidence. It had been observed many times that if water were boiled for a long time in a glass vessel, at least some of the water hardened and coalesced into solid particles which could be seen plainly.

In 1770, however, a new man was on the scene. The French chemist Antoine Laurent Lavoisier (1743-1794) demonstrated the importance of measurement in chemistry so unmistakably as to make it an integral part of the science forever. Why not, then, use measurement to help interpret the experiment in which water boiled itself, at least partly, into earth? Lavoisier began with a large, clean glass vessel which he weighed carefully. He added water and heated it till the air within the vessel was driven out and replaced by steam. He then sealed the vessel and weighed it again. Subtracting the weight of the empty vessel gave him the weight of the water itself.

He then gently boiled the water for over three months. The steam condensed at the top of the vessel and rolled down to the bottom to be boiled again. Distinct grains of solid matter appeared in the flask.

After 101 days, he stopped the fire and let the vessel cool. He weighed it again, with its water content, and the total weight of vessel plus water had not changed measurably. Filtering out the solid material, he found the weight of the water itself was also unchanged. The weight of the empty dried glass container, however, had *decreased* by a thirtieth of an ounce.

It was clear now what had happened. Through prolonged exposure to hot water, some of the substance of the glass vessel had eroded. The solid flecks were from the glass and not from the water, and water had not been turned into earth. This was recognized as the final defeat of the Greek notions of the elements.

Through the decade of the 1770s, the new view of elements received further confirmation. Different gaseous elements were discovered and, in 1774, Lavoisier presented strong evidence that air was no more an element than earth was. Air, he maintained, was a mixture of two elements which he named oxygen and azote (though nitrogen is now used for the latter).

With earth and air gone from the list of elements, what about water? Was water an element in the new-

An alchemist added water and it turned into more willow tree, "proving" water to be the supreme element.

Lavoisier passed steam through a heated gun barrel, producing a rusty gun and a stream of hydrogen.

fashioned meaning of the word? Could water be broken down to simpler substance? Could it be built up from simpler substances? This question arose when many chemists, especially in England, held to the concept of phlogiston, a subtle, weightless fluid which, they believed, transferred from one substance (such as wood) to another (such as air) during combustion.

One of these English phlogistonists was the chemist Henry Cavendish (1731-1810). In 1766, he had treated certain metals with acid and had noted that a gas was given off which was extremely inflammable. He called it "inflammable air." Actually this gas had been noted earlier by several chemists, including Boyle, but Cavendish was the first to describe it carefully and to work with it, so he is usually considered its discoverer.

Cavendish was fascinated by the unusual properties of "inflammable air." For one thing it was extremely light, much lighter than air. Secondly, it burned so easily, even explosively. Might the light, combustible "inflammable air" really be phlogiston?

When "inflammable air" burned, whether it was pure phlogiston or merely a gas with an abnormally high phlogiston content, the end product ought to be "phlogisticated air"—that is, air with so much phlogiston in it that it would no longer support combustion.

Some chemists had observed the burning of "inflammable air" but had come to no conclusion as to the product. For one thing, they worked with small quantities, and any product formed was present only in traces. Some reports had spoken of droplets of liquid forming after "inflammable air" had burned, but there was no clear identification of that liquid. Cavendish had tried such experiments also and received no clear-cut answers. He puzzled over the early results and held his counsel till he had straightened matters out to his own satisfaction.

Finally, in 1784, he felt on sufficiently firm ground to describe what he had done. He began with a large quantity of "inflammable air" and plenty of ordinary air. When all the "inflammable air" had been burned under conditions designed to retain the product, he found about a quarter of an ounce of liquid at the bottom of the vessel. That was enough to analyze, and the results were rather startling—he had formed water.

Cavendish explained this in terms of the phlogiston theory, equating "inflammable air" with water that had an extremely high phlogiston content.

Lavoisier heard of Cavendish's experiments almost at once, but he was quite convinced that air was composed of two gases (azote and oxygen), and combustion consisted of the combination of the burning substance with oxygen.

He repeated Cavendish's experiment, confirmed the production of water, and interpreted this as signifying that "inflammable air" combined with oxygen to form water. He renamed "inflammable air" at once, calling it "hydrogen" from Greek words meaning "water-former," and that has been used ever since. By Lavoisier's system, the burning of hydrogen took on a new and much greater importance. It meant that water was not an element, but was a combination of two elements, hydrogen and oxygen.

The end of the Greek element

To maintain that water was a compound substance and not an element was something that needed all the evidence one could gather. Having argued that hydrogen and oxygen could be combined to form water, Lavoisier next wished to demonstrate that water could be pulled apart again to form hydrogen and oxygen.

This he could do, but only in part. He passed steam through a heated gun barrel, and the hot iron pulled the oxygen out of the steam. That this had happened was proved, indirectly, by the development of rust along the inside of the barrel, for rust, by Lavoisier's chemistry, was a compound of iron and oxygen. To be sure, the oxygen was not isolated *as a gas,* but what was left of the water (after its oxygen had been subtracted) appeared at the other end of the gun barrel—a stream of hydrogen.

The final blow to the idea that water was an element came in 1800, six years after Lavoisier's death. In 1800, the Italian physicist Alessandro Volta (1745-1827) developed the first electric battery, a device which served to produce a usable current of electricity. The news reached England on March 20 and by May 2 an English chemist, William Nicholson (1753-1815), and his colleague, an English surgeon, Anthony Carlisle

Analysis of coal and the breath of men and guinea pigs led to the law of conservation of matter.

(1768-1840), had constructed a battery on their own.

Nicholson and Carlisle used the battery to pass a current through water and found bubbles of gas being given off. Investigation soon showed these to consist of hydrogen and oxygen, and it was not at all difficult to collect them separately. Water had been "electrolyzed," and Lavoisier's contention had been proved.

Lavoisier had noticed that when chemical reactions took place in a closed system, the mass (considered a measure of the quantity of matter present) never changed, whatever the reaction. Was this universal, or did it apply only to the simple mineral substances that chemists worked with?

When coal burned, oxygen was consumed and carbon dioxide was produced. When animals (including man) breathed, oxygen was consumed and carbon dioxide was produced. Must it not be, then, reasoned Lavoisier, that respiration was a form of combustion taking place in living tissue, and was the quantity of matter maintained unchanged (that is, was matter "conserved") in the body also?

Between 1782 and 1784, Lavoisier and a co-worker, Pierre Simon de Laplace (1749-1827)—far better known in later years as a great astronomer—had carefully measured the oxygen consumed and carbon dioxide produced by a guinea pig and matched the heat developed by it with that developed by burning ordinary carbon under conditions that consumed an equal quantity of oxygen. The results were puzzling. Some of the oxygen consumed by the guinea pig did not show up as carbon dioxide. Had some of the oxygen disappeared? What's more the guinea pig produced more heat for the oxygen it consumed than the coal did. Did living tissue produce heat out of nothing?

As soon as the compound nature of water was worked out, Lavoisier had the answer to the puzzle. It was not merely the carbon of living tissue that combined with oxygen, but the hydrogen also. It was not merely carbon dioxide that was being produced, but water, too. Once the water content of the expired breath was measured, that accounted for the missing oxygen. The greater amount of heat formed by combining hydrogen (rather than carbon) with oxygen, explained why the guinea pig produced more heat.

Lavoisier was convinced, then, that the quantity of matter remained constant even in the complicated and mysterious reactions that went on in living tissue. He announced his "law of conservation of matter," and that has been a cornerstone of experimental chemistry (despite its slight modification by Einstein's theory of relativity) ever since.

The discovery of the compound nature of water led onward, after Lavoisier's death, to something that was even more revolutionary. Lavoisier's stress on the importance of measuring had wide influence and meant that chemists were not content with noting that hydrogen and oxygen combined to form water. The question now became: How much hydrogen combined with how much oxygen to form how much water?

Cavendish reported in 1784 that a particular volume of hydrogen required two-and-a-half times its own volume of air for complete burning. Since one-fifth of the air was oxygen, this meant that a particular volume of hydrogen combined with one-half its own volume of oxygen.

In 1786, the French mathematician Gaspard Monge (1746-1818) reported his work in the area. He weighed the oxygen and hydrogen that combined and the water that was produced. He found, first, that the

water produced had exactly the mass of the hydrogen and oxygen (together) with which he had started, thus upholding the law of conservation of matter. Second, while the oxygen might have a smaller *volume* than the hydrogen it combined with, that smaller volume was considerably *heavier* than the very light hydrogen. He found that a given weight of hydrogen combined with eight times its own weight of oxygen.

Similar measurements of the relative weights of different elements that combined to form a particular compound were carried out by others, particularly by the French chemist, Joseph Louis Proust (1754-1826). By 1799, Proust was able to maintain that all compounds consisted of combinations of definite proportions of elements by weight and that these proportions did not and could not vary. The case of hydrogen and oxygen combining in a one-to-eight weight-ratio remained the most spectacular and easily cited case.

Proust's "law of definite proportions" gave an enormous impetus to the development of an atomic theory. Many of those who had pondered on the nature of the universe had come to the conclusion that matter must be made up of tiny indivisible units, even back in Greek times. So far, though, it had been speculation.

Beginning in 1803, however, the English chemist John Dalton (1766-1844) went a crucial step further. Not only did he postulate the existence of atoms, as many before him had done, but for the first time in human history he began to work out what their properties might be, from experimental data.

Weighing in with atomic theory

Suppose both hydrogen and oxygen are made up of atoms, and that in forming water one atom of hydrogen combines with one atom of oxygen. But Monge had found that a given weight of hydrogen combined with eight times its own weight of oxygen. So, Dalton reasoned, an individual oxygen atom is eight times as heavy as an individual hydrogen atom. The *actual* weight of the two atoms could not be determined by Dalton, but he could state them in relative terms. If the weight of the hydrogen atom was set at one, then the weight of the oxygen atom would have to be eight. He determined the weight of other types of atoms on this same basis, by using the law of definite proportions, and thus devised the first table of "atomic weights," converting the atom from the vague speculation of the philosopher to a concept that was useful, and even indispensable, to the chemist.

To be sure, Dalton was incorrect in some details. Before long it was pointed out that since, in terms of *volume,* two parts of hydrogen combined with one part of oxygen, it followed that two atoms of hydrogen combined with one of oxygen to form water (hence H_2O). That meant the single oxygen atom was not eight times heavier than a single hydrogen atom; it was eight times heavier than *two* hydrogen atoms and therefore 16 times heavier than one. If the atomic weight of hydrogen is set at one, then the atomic weight of oxygen is 16.

Despite this correction, and many others, and despite considerable elaboration and increased sophistication, Dalton's atomic theory—stemming in large part from the manner of combination of hydrogen and oxygen to form water—remains the framework of modern chemistry.

The 18th-century discovery that the lighter-than-air gas, hydrogen, combines with oxygen to form water led chemistry to ascend to its present heights.

By Robert Evett

Mrs. Shouse's new pleasure dome

Representing a marriage of private funds and public subsidy, Wolf Trap Farm becomes our first national park for culture

At about 5:15 on the morning of March 13 of this year, Mrs. Jouett Shouse got a telephone call from an associate to tell her that the Filene Center at Wolf Trap Farm in Vienna, Virginia—a huge outdoor theater which she was constructing at a cost of about three million dollars—was in flames. Later she remarked drily, "It took me a long time to save three million dollars."

Mrs. Shouse, who is an early riser, was already dressed, and by the time she had driven the 20 miles from her town house in the District of Columbia to the theater, the fire was under control and most of the damage was done. As she observed, a first-class arsonist bent on destroying the place would have started with the stage, which was so near completion that a conflagration would have been ruinous. As it was, the firebugs, presumably a few kids out for a lark, contented themselves with burning part of the hall. In money, the prank—if that is what it was—cost about $650,000. It did not, however, cost Mrs. Shouse the pleasure of seeing her Center open on schedule on July 1.

Mrs. Shouse is now 75 years old. In her instance, this does not mean that time has been hard on her or slowed her down appreciably, but it does mean that to have a dream and vision of such magnitude as the Filene Center go up in smoke would have been a serious disappointment. That it would not have been an incapacitating disaster is shown by her conduct during that bleak sunrise. Realizing that the firemen would be exhausted by their night's work putting out the blaze, she drove to the nearest town and, finding one of those little grocery stores that are open early and late and charge famine prices for everything, she loaded up with coffee, canned ham, milk, doughnuts and whatever else hungry, tired men could use, drove back to the Center, and fed the multitude.

Robert Evett, a composer and critic, wrote about the Smithsonian's collection of antique instruments in the August 1970 issue of this magazine.

A New England mercantile fortune

She was born Catherine Filene, the granddaughter of a Boston merchant who had been wiped out in the 1880s. Out of his ruin, his sons, wizards at merchandizing, built the grandest department store in New England and made themselves and their heirs rich. Mrs. Shouse remarks that her Uncle Edward never got a proper education because the family was too poor to give him one, and that a consuming bitterness of his later life was that nobody ever gave him an honorary academic degree.

She herself was never at such a disadvantage. She was the first woman to win an M.A. from Harvard (the field was Education, the year 1923), and shortly after that she moved to Washington, which has been her home for almost 50 years.

In 1930 she was looking for a summer place in a heavily wooded area of northern Virginia that reminded her of a part of Massachusetts that she had enjoyed as a girl. A property of perhaps 150 acres that was advertised met her requirements, so she bought it and named it Wolf Trap Farm, after Wolf Trap Creek, which flows through it into Difficult Run.

As long ago as 1961 she gave some of the land and buildings to the American Symphony Orchestra League for its permanent home. Some years later it occurred to her that the unspoiled natural beauty of the place ought somehow to be made available to the public, so she wrote a letter to the Governor of Virginia offering a hundred acres or so to the state for use as a park. Whether through oversight or intent, the letter was never answered.

Subsequently, she hit on the idea of using the grounds for a sort of Dixie Tanglewood, donating 117 acres and some buildings to the United States government and placing the complex in the custody of the National Park Service. It thus represents a marriage of private philanthropy with public subsidy of an artistic venture. At the end of its first season, Wolf Trap resembles Tanglewood in two respects: It has, in the Filene Center, a music shed that holds 3,500 people and a park which, on the Fourth of July, accommodated another 15,000 or so. And it has, through affilia-

tion with American University, an educational program which trains singers, dancers, theater people and orchestral performers who appear in events at the Center. Unlike Tanglewood, it does not have, nor does it intend to have, a major orchestra as a permanent fixture. And, in its educational facilities, it does not yet maintain a composer in residence nor does it offer any special form of training or encouragement to young composers, although these are possibilities for the future.

By sheer luck, the law does not permit the Park Service to engage performers for the Center. This responsibility falls on the board of directors of the Wolf Trap Foundation, who can be relied on, as no government bureaucracy could, to maintain artistic standards high enough to justify all this effort while at the same time responding to public demand. Mrs. Shouse hopes that within a couple of years the place will be self-supporting, and it was extremely shrewd of her to leave the taxpayers with the responsibility of maintaining her gift rather than having to raise an endowment many times larger than the gift itself to keep the place going. But the tangle of red tape that has to be cut is most intricate. Aside from ticket sales, which will defray part of the cost of the events on stage, the Center needs a restaurant, the profits of which would go into the kitty. The Park Service is not allowed to construct any buildings at Wolf Trap, so somebody, presumably Mrs. Shouse, will have to supply this facility. To make any money out of the restaurant, it will have to be at liberty to sell booze by the drink, a practice frowned on by both the State of Virginia and the National Park Service. So for this and many other reasons, current deficits must be met by private funds.

Politics and philanthropies

Kay Shouse, as she is known to her friends, has always been at the fringe of public life, and there is a clear relationship between the color of her politics and the nature of her philanthropies. In her youth she was an ardent and active Massachusetts-style Democrat, and when she married her second husband, Jouett Shouse, in 1932, he had worked his way up from being a Democratic Congressman from Kansas during World War I to becoming an Assistant Secretary of the Treasury and, between 1928 and 1932, chairman of the National Democratic Committee. Many men boast of their friendship with Presidents; Mr. Shouse's greatest distinction was that he had a terrible row with Franklin Roosevelt even before Roosevelt became President. Shouse, for his part, founded the American Liberty League in 1934 and became one of the most eloquent spokesmen of the radical right of the thirties.

Mrs. Jouett Shouse receives congratulations at the opening of her Filene Center last July.

Mr. Shouse was much older than his wife and though she continues after his death to wear his name with pride, their marriage was complicated by the fact that since they were people whose interests were by no means identical, they felt free to pursue their private lives when they were so inclined. There is no public record that Shouse lavished much of his time on symphony orchestras, or that Mrs. Shouse shared her husband's interest in breeding a champion boxer dog or a prize-winning racehorse.

In politics, however, Mrs. Shouse followed her husband's lead. She became, and is, an ardent Republican. She, like her mother, is genuinely concerned with the plight of the destitute and underprivileged poor. According to one writer, she was "chairman of the first Federal Prison for Women and established its first vocational training program." How these unfortunate women survived their incarceration or profited from their rehabilitation programs would be beyond this inquiry into Kay Shouse's style if it did not reflect her goodwill toward, and concern for, persons at the bottom of society and at the very end of their rope.

Faced with poor people of her own educated middle class, however, her native empathy and humanitarianism has been clouded. When her hometown orchestra, the National Symphony, was created in 1930, she did not have enough money to act as one of its founders. However, when the machinery of the orchestra

changed in 1949, she was elected to the board, and in 1951 was named vice president of the National Symphony Association. In a word, she became Management. Because of the intensity of her commitment and generosity to the orchestra, and her exertions on its behalf, she acquired a greater power than her title would suggest, and during three strikes by the orchestra—an unprecedented number, the one in the spring of 1964 being the longest and most acrimonious in the history of American symphony orchestras—she gave unqualified support to the conductor and manager in the teeth of the musicians' modest request for better treatment and better pay.

These issues are dead now, because the base pay is adequate, both the conductor and the manager are gone, and Mrs. Shouse is still a power there. She has the reputation, well-earned, of being a formidable woman. She is feared but not, to my knowledge, hated or even disliked by anyone who has come into contact with her; and three aspects of her character which were so much in evidence at the near-disaster at the Filene Center were clearly delineated in the catastrophic 1964 strike: First, that as an heiress to a fortune that had had its ups and downs, she was inured to the possibility of disaster; second, that as the ranking princess of a mercantile dynasty, she refused to be intimidated, even by a mass of people whom she accepted as her peers; third, and most important, that her loyalty to and confidence in an old friend—this time, the conductor—were stronger than the heavy influences put upon her to withdraw her support of him.

Her most generous gifts to other people have been things that will give them pleasure, and it is in keeping with her character that instead of building a hospital wing or endowing a chair in philosophy or building a chapel, she chose to erect a great theater in memory of her parents, Lincoln and Therese Filene.

The Filene Center is made of wood, a substance chosen for its acoustical affinity to music. The architects, John MacFadyen and Edward F. Knowles, selected native cedar which, unpainted, will turn silvery gray as it weathers. After the fire a major obstacle to repairing the damage was finding an adequate supply of properly seasoned lumber, which had to be shipped to Virginia from Seattle in the face of an impending rail strike.

Obtaining the wood and getting it to Wolf Trap is the kind of challenge to which Mrs. Shouse rose with particular vigor. She not only got the material, but set up her ménage at the building site to be available at all times in the event of a further emergency. She had prudently kept a few acres of the farm and a comfortable house for her own use, and moved into it without taking the precaution of bringing an adequate wardrobe from her house in the city. So she had them make a cape for her out of material left over from the theater's curtain. It is a gaudy garment, a coat of many colors patched together in great rectangles, and she delights in posing in it like a mannequin, swirling it around her.

Because of the iron in her nature, it is easy to overlook the femininity and charm in the woman herself. She must have been beautiful in the conventional sense as a young woman. Now, at the verge of old age, she has let her figure go, has accepted the wrinkles which a woman of her age must expect, and enhances her natural appearance only with the barest touch of color at the lips. It would be difficult to say for sure whether she actually has the kind of twilight beauty W. B. Yeats so admired in aging Maud Gonne, or whether it is her commanding presence that gives this illusion.

Realism, candor and generosity

Fortunately, she is not a lonesome widow. She shares her residence, wherever it happens to be, with her friend, companion and aide-de-camp of many years, the elegant Princess Kotchoubey de Beauharnais, and enjoys the company of a large, hard-working staff.

"Elegant" is not a word one would apply to Mrs. Shouse. She is too realistic, too down-to-earth, too candid. Her most endearing characteristic is that she has allowed her generosity to follow the course most congenial to her imagination.

The fact that Wolf Trap belongs to the nation and is situated at the seat of government makes it easy to exaggerate its national significance. In fact, it will be of greatest value to people who live within driving distance of it and tourists passing through. But it is our first national park dedicated to culture rather than scenery. And if it is successful, it can be used as a model for other projects which will involve the government in the sponsorship of the performing arts.

Showing no signs of a near-disastrous fire in March,
Filene Center glows like a lantern in the dusk.

The interior, shown with the orchestra shell in place,
has every facility for full-scale opera productions.

By Rice Odell

You can't shoot the rapids on a man-made lake

With a flood of arguments, Army engineers seek to dam Virginia's Rappahannock, but local opponents say that their reasons don't hold water

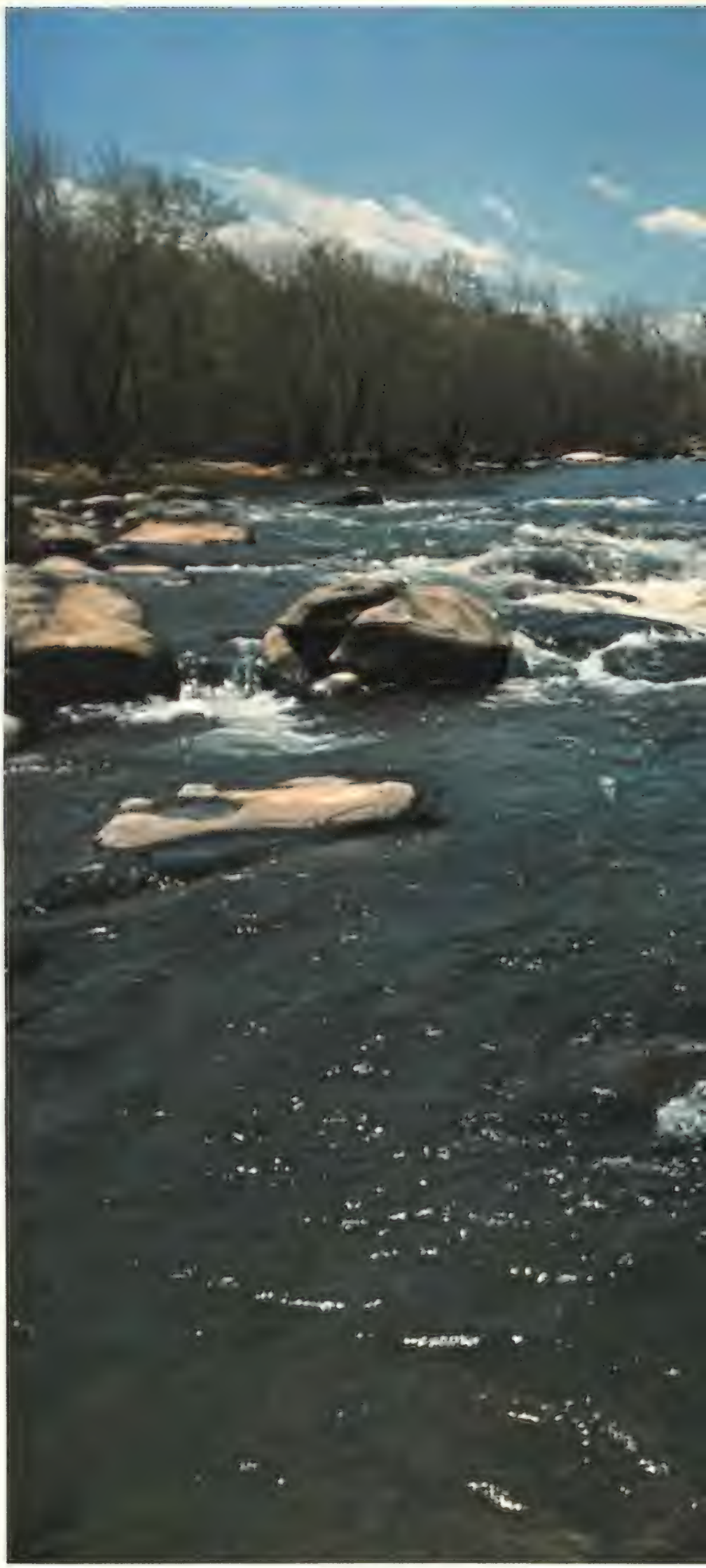
Periodically, Charles S. Rowe, editor of the *Free Lance-Star* in Fredericksburg, Virginia, sits down at his typewriter and composes an angry editorial denouncing plans to build a huge dam and reservoir on the Rappahannock River a few miles above the city.

Rowe has called the Salem Church Dam proposal "one of the most wasteful pork-barrel projects imaginable," and has referred to local supporters of the dam as the Army Corps of Engineers' "loyal legion of lobbyists." Never mind that a long-time supporter of the dam has been his brother Josiah P. Rowe, III, who not only is mayor of Fredericksburg but general manager and co-owner of the newspaper as well (p. 43).

The Salem Church controversy has all the elements of a classic environmental "crunch." The Rappahannock, which is joined by its principal tributary the Rapidan River, rises on the slopes of the Blue Ridge Mountains and flows 185 miles through hilly woodlands and pastoral farmlands into Chesapeake Bay.

All was serene until one week in October 1942, when torrents of rain—19 inches in one place—fell in the Rappahannock watershed. The river poured a 42-foot crest of water down on Fredericksburg and nearby areas. More than 200 businesses and 180 homes in the city were covered with water at depths up to five feet; fires started at oil storage plants near the

Rice Odell writes the Conservation Foundation's monthly CF Letter, *one of the most highly respected bulletins in the environmental field.*



A canoeist bursts between the rocks at Kelly's Ford rapids, which may soon be inundated.

Photographs by Richard Swanson

river. Damage was estimated at about $1.2 million.

Community leaders prodded Congress for protection; Congress went to the Corps of Engineers, and the Corps concluded that it would be impractical or uneconomical to provide protection by building a large dam near the city just for flood control.

But the Corps specializes in construction; it recommended construction at the Salem Church site of a high dam with two major purposes: protection against floods by backing up floodwaters in a 240-foot-high reservoir and generation of hydroelectric power for sale by releasing the stored water.

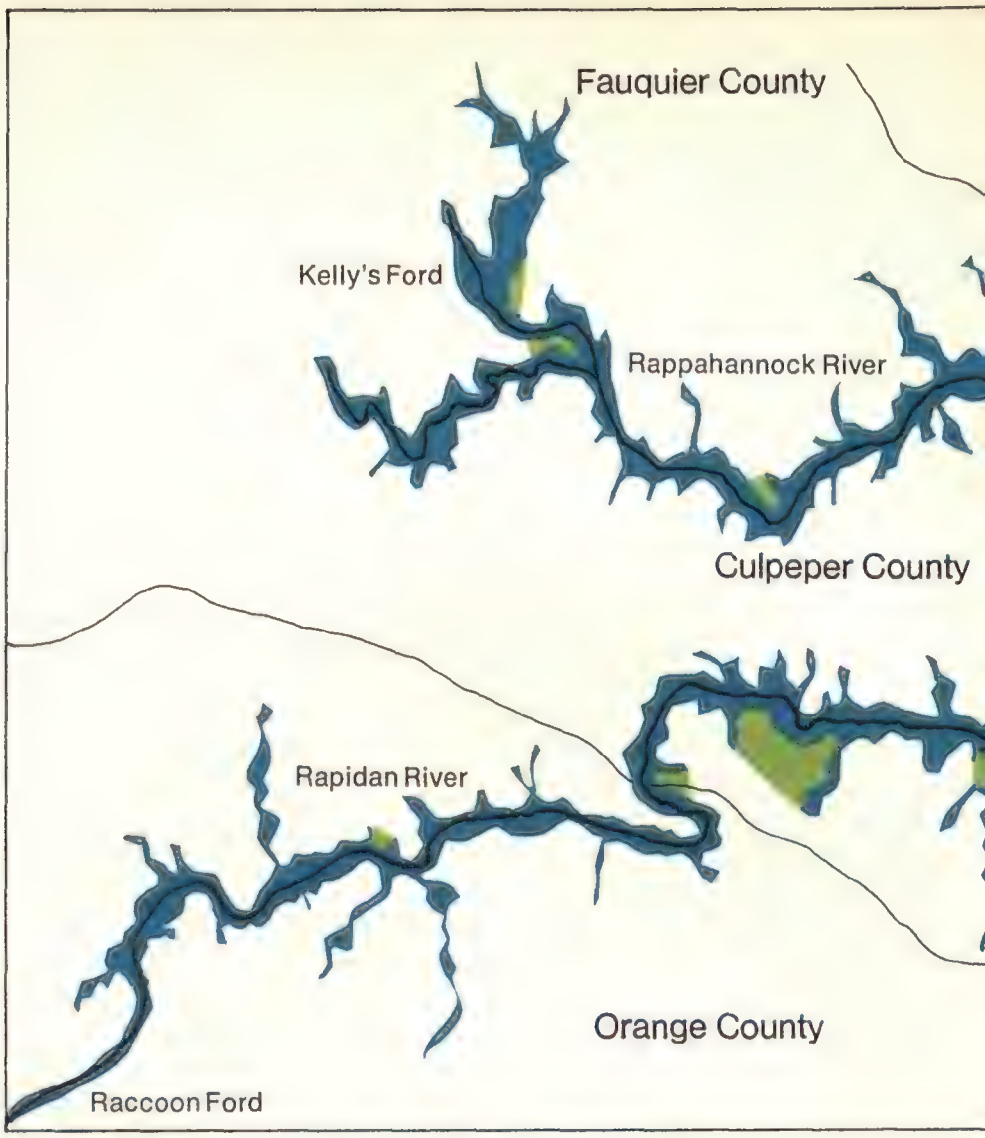
At normal level, the reservoir would cover 21,300 acres, inundating farm and other lands in five counties; it would obliterate 26 miles of the Rappahannock River and 27 miles of the Rapidan, creating instead a series of long, twisting fingers of water with the look of a Rorschach inkblot (see map). Annual charges for the project (interest on investment, amortization, operation and maintenance) would be $1,165,900, while annual benefits (principally the value of electric power) would be $1,774,850.

This produced an economically attractive "benefit-cost ratio" of 1.52 to 1; for every dollar spent on the project each year, it would result in benefits, or damages avoided, of $1.52.

Congress authorized construction of a Salem Church Dam in 1946—but restricted the height of the reservoir to 220 feet, chiefly because upstream farmers had howled over having so much of their acreage flooded.

But power generation would not be feasible at 220 feet so the Corps was stuck with an authorized project which, it was forced to admit in 1952, had a benefit-cost ratio too "marginal" (1.11 to 1) to justify construction. The dam project was in limbo.

In 1966, the Corps surfaced again, not only recommending a reservoir at the original 240-foot level, but



A 240-foot high Salem Church dam would create a Rorschach-like reservoir (blue) with 420

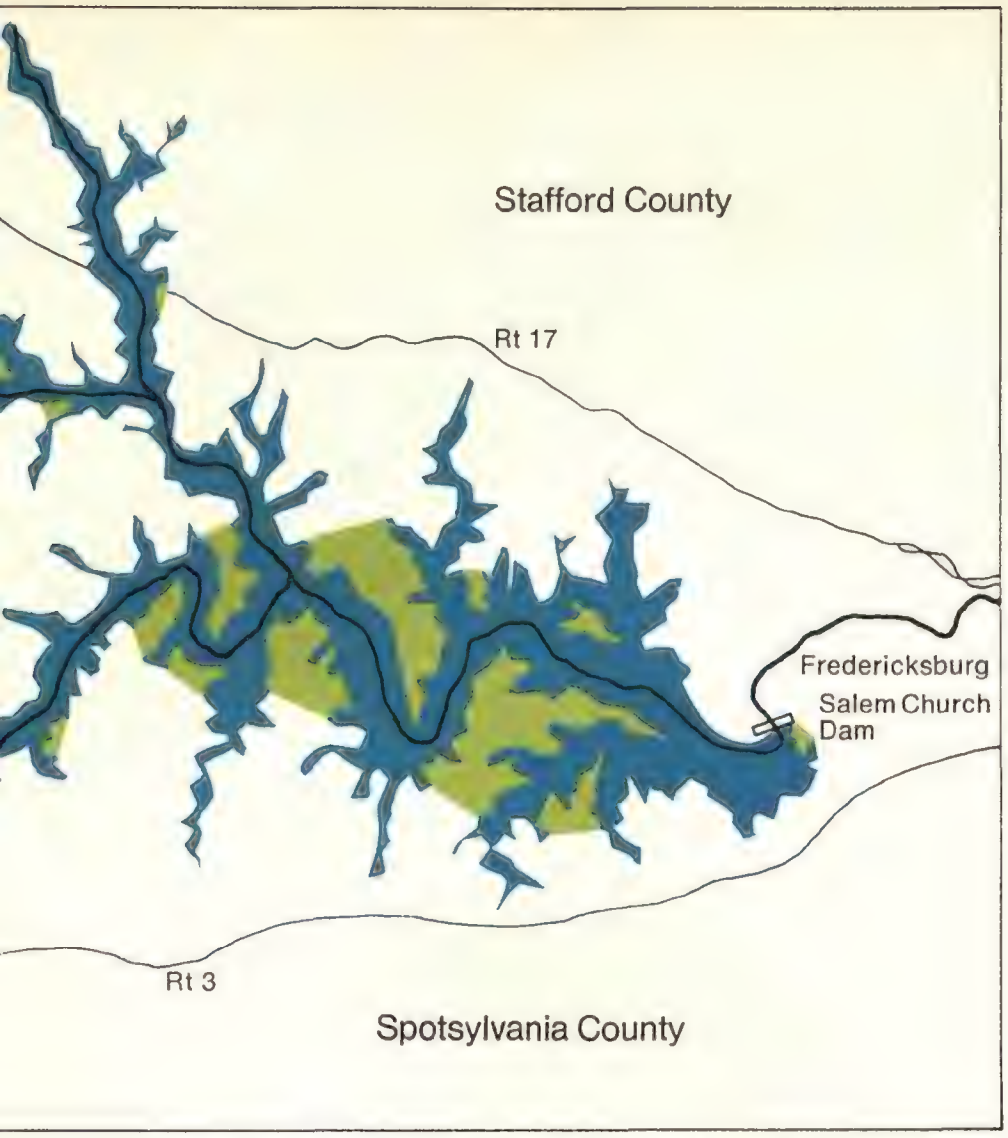
showing a benefit-cost ratio of 2.1 to 1, far more favorable than before. (Annual costs of $3,464,000; annual benefits of $7,290,000.)

How did the Corps manage to revive the dam with this numerical feat? This becomes increasingly difficult as the most feasible projects are built, leaving less favorable rivers and dam sites to work with. But Congress, and in some cases the Executive Branch, have continually changed the rules by which projects are evaluated, adding to the list of benefits which the Corps is permitted to crank into its evaluations.

The Corps now could recommend a *multi-purpose* project with the following benefits (shown with the percentage of total annual benefits attributed to each):

Recreation	41.0 percent
Power generation	23.4 percent
Salinity control	20.4 percent
Water-quality control	8.3 percent
Water supply	4.7 percent
Flood control	2.2 percent

Recreation became the dominant justification for the project, while flood protection, the original reason for it, accounts for a mere 2.2 percent of the benefits.



miles of shoreline west of Fredericksburg.
Green regions are potential recreation areas.

This may be appropriate, since there hasn't been a flood of any significance for almost 29 years.

Also the Corps found another important new peg—"salinity control." In the lower Rappahannock and its estuary there are productive oyster grounds. As the water gets saltier closer to Chesapeake Bay, the oysters are more susceptible to predators and disease. Releases of fresh water from the reservoir in summer, the Corps reasoned, would increase oyster production.

Again the dam had strong support—from the city of Fredericksburg; from bankers, businessmen and others who wished to see construction and other dam-related activity stimulate the area economy; from Fredericksburg's single large industry, the American Viscose Division of FMC Corporation, which is the largest cellophane manufacturing plant in the world and which uses huge quantities of water for both processing and cooling; from most counties and towns in the region; from oystermen downstream; from various state agencies; from all relevant federal agencies; and even from far-off Prince William County to the north which feels the Salem Church reservoir will be the most economical way to meet future water-supply needs.

In contrast to this powerful array were some 200 landowners who objected to the flooding of their farms. And then there was Randy Carter.

Carter is a Fauquier County building inspector who lives in Warrenton, well above the area which would be flooded. He is an expert, well-known, white-water canoeist, and he was particularly concerned over the proposed inundation of Kelly's Ford rapids, a long and superb stretch of bounding, rock-strewn water unique to Northern Virginia.

Carter later testified before a congressional committee that flooding this section of the Rappahannock would "destroy something that is priceless and something that nature has given us very little of. Engineers can give us flat water but only God can give us a beautiful, fast-water, mile-and-a-half like the Kelly's Ford rapids." Carter has also pointed out that the Rappahannock is "one of the best small-mouth bass streams on the East Coast." So he began to fight. He was a lone wolf for a long time, says Robert T. Dennis, director of the Central Atlantic Environment Service, who joined Carter in opposition. Carter organized the landowners and other canoeists and conservationists. He also spurred opposition to Salem Church by the businessmen and officials of Fauquier and Culpeper counties, since the reservoir would flood and remove 20,000 acres from their tax base.

Among other things, Carter urged the Corps to consider a lower dam—so less upstream land need be taken and so the reservoir, though flooding other rapids downstream, would not quite reach over Kelly's Ford. "I told them, 'You've made this report, and you've never seen the river.' "

An awkward event for conservationists

In the summer of 1966, however, Fredericksburg was plagued, not by a flood, but by a drought. The city had to restrict water usage.

The drought scare boosted support for the Salem Church Dam. "Feeling was running very high," said Samuel P. Mason, later a president of the Fredericksburg-Rappahannock Chapter of the Izaak Walton League of America. He noted that Fredericksburg (and two neighboring counties) had no long-range plans to assure a water supply for their residents. "So the dam looked pretty good to those of us who liked to drink water." In view of this, the Izaak Walton Chapter in 1967 voted in favor of Salem Church.

The drought also spurred Fredericksburg and the two counties to plan construction of small works to provide enough reserve water supplies to last until construction of the high dam. These interim actions allayed the fears of many. In 1969, the Izaak Walton Chapter voted to reverse its position and oppose the

Canoeists drift down one of the river's many quiet stretches through Virginia's pastoral landscape.

dam. There was a bitter split and the chapter lost some of its members.

Congress finally authorized construction of a 240-foot level dam in 1968. But its opponents have continued to work assiduously, compiling more arguments against it, and lining up important new allies. They claim many of the figures and techniques with which the Corps calculated its 2.1 to 1 benefit-cost ratio are bogus. Any such evaluation process, to be sure, is more art than science.

On March 18, 1970, Senator William Proxmire of Wisconsin accused the Corps in general of using various unsound and improper evaluation procedures: "They include the consistent overestimation of the economic benefits. They include the understatement of the cost of these projects. They include the neglect, indeed disdain, of the environmental disbenefits which appear as side effects to the manipulation of natural rivers. They include the use of very low interest rates to evaluate the present worth of the future impacts of these projects, a practice which artificially bloats the benefit-cost ratio."

The Salem Church opponents claim that the Corps did not sufficiently explore all alternatives to the high dam. They scoff at the Corps' cost estimates for the 47,453 acres of privately owned land the government would have to purchase—an average $60 for a wooded acre and $200 for a farmland acre. This year Mayor Rowe noted that to buy land for its smaller water-supply impoundment, the city paid almost $1,500 an acre for "remote woodland."

The dam's opponents also challenge the very need for its benefits, as follows:

FLOOD CONTROL—Salem Church wouldn't eliminate all flood damage, and the Corps has inflated its estimate of damage that would be prevented, it is said. Much of the serious damage in 1942 was caused by a local flash storm that poured rain over an already flooded area. Damage would have been far less had there been more than a few hours' warning.

WATER SUPPLY—Smaller impoundments, such as those already being built, are seen as an answer to water-supply problems for decades. Prince William County is considered too far away to be justified in relying on the Rappahannock for its water.

WATER-QUALITY CONTROL—"Low-flow augmentation," or releasing water to dilute and flush pollutants downstream, is viewed as an improper substitute for

requiring industries and municipalities to treat their wastes before discharge. Dam opponents wonder how relevant this benefit of Salem Church will be if waste-treatment technology improves significantly after the dam is built.

POWER GENERATION—Dam opponents say the power capacity at Salem Church (89,000 kilowatts) is not needed and would be a mere spark next to the vast capacity of the huge North Anna nuclear power plant which is about to be built nearby by Virginia Electric and Power Company (initial capacity 800,000 kilowatts, later four million).

SALINITY CONTROL—Salem Church opponents doubt the efficacy of using controlled water releases to increase oyster production or of timing them accurately enough to discourage the oysters' enemies. Carter put it this way: "We do not see why we should have our dirt farmers in upper Fauquier and Culpeper counties flooded out for the benefit of oyster farmers a hundred miles further downstream."

RECREATION—Most of all, Salem Church opponents attack the project's heavy reliance on mass recreation. The dam has become a classic illustration of the basic, irreconcilable conflicts between two different types of recreationists—between two different types of personalities, really, seeking to use the same waters. On one hand are the stream fisherman, the hiker, the hunter, the canoeist—the "purists" who like their nature in the raw, with its quiet and reflective solitude. On the other hand are the outboard boater, the water skier, the swimmer and picnicker—the mass, "flat-water" recreationists who gravitate more to each other and to facilities provided for them, though they too are learning to dislike crowding.

The so-called purists have had two strikes against them in trying to counter the Corps' arguments. For the Corps, with earlier assistance from the Interior Department's Bureau of Outdoor Recreation (BOR), worked up a strong statistical case to show that the 27-mile-long reservoir would be a recreational boon for everyone within many miles. The reservoir's 21,300 acres would, said the Corps, be "ideal for skiing and boating." Its meandering 420 miles of "pleasing shoreline and sheltered coves" would attract fishermen, picnickers, swimmers, hikers and campers. BOR and the Corps gave each visitor-day a value of one dollar. Since the *average* number of visitor-days per year was estimated at 3,580,000, the total recreation benefit was a staggering $3,580,000 per year.

To get *net* benefits, the Corps had to deduct the present recreation values. BOR estimated that only 300 canoeists a year used the stretch of the river to be flooded. It gave each white-water canoeing day a value of three dollars, and thus arrived at the grand total of $900 a year in canoeing benefits to be foregone.

Randy Carter, building inspector, expert white-water canoeist, is a leader of the dam's opponents.

The conservationists pointed out that if such reservoir justifications were carried to the extreme, the free-flowing rivers would disappear and along with them the recreation choices and diversity they provide. Carter says that he asked a Corps official "if he thought we should take down the priceless and beautiful paintings of old masters in our art galleries and museums and replace them with pinup girls. His reply was that we should, because more people would come to see the pinup girls."

The dam's opponents could scarcely hope to win a confrontation on recreation economics—or on philosophy. But they had a trump card.

"Why is a new lake needed *15 miles* from the Potomac River, most of which is still waiting for recreational development?" asked Carter. "Why, also, do we need another lake *20 miles* from the new lake being built by the Virginia Electric and Power Company on the North Anna River, which will be open for public recreation? In other words, why have a taxpayers' lake sandwiched in between the mighty Potomac and the new 11,000-acre recreational lake?"

That argument has probably done the most to cast doubt on the advisability of building Salem Church

Dam. By 1969 the Salem Church proposal was caught up in the nationwide surge of interest in the environment, which included a healthy new respect for scarce rivers of such natural value as the Rappahannock. It is perhaps symbolic that, whereas in 1967 the conservationists were floating 27 canoes and kayaks down the Rappahannock in a "protest paddle," two years later they were maneuvering in upper echelon politics. Under Secretary of the Interior Russell E. Train got involved, and on August 7, 1969, Secretary Walter J. Hickel wrote Secretary of the Army Stanley R. Resor that he was forming a task force under BOR to consider the advantages of "retaining the Rappahannock River in a natural condition."

By this time, BOR was singing a different tune. Six years earlier, it had characterized the river as providing "low-grade canoeing opportunity." But when its new study was released on April 1, 1970, BOR had discovered Kelly's Ford rapids, and virtually rhapsodized over the river's white-water canoeing and its other values.

BOR recommended strongly against construction of the Salem Church Dam, at least for now, and said those areas of the Rappahannock to be flooded qualify for inclusion in the National Wild and Scenic Rivers System which was set up by Congress in 1968. The state of Virginia also moved toward making the Rappahannock one of its own scenic rivers.

In 1969, Congress appropriated $150,000 to begin preconstruction planning of the dam. The Corps was given another $600,000 for planning in 1970 and will probably get an additional $500,000 requested this year. In 1969, at the insistence of the House, the Corps was directed to "restudy" the project to find out if it could be "modified to minimize any adverse effects on natural values in the area."

Conservationists quite understandably wondered how you can "restudy" a project and still engage in preconstruction planning. Dennis, speaking for the Conservation Council of Virginia, told a congressional committee that "this is the sort of thing which makes the average citizen question the working of the democratic system. Here we are, at your direction, taking a fresh look at an environmentally controversial project to see if it really makes sense—and yet you are being requested to appropriate a huge sum to continue planning of the precise project which has aroused the controversy."

Recently local governments, which are required by law to pay part of the recreation and water-supply costs of a project they benefit from, have begun to worry more about the size of their contributions, what with the increasing total cost of the project. In a letter to Congress on May 26, Mayor Rowe again supported funding for Salem Church, but he added that the Corps had better clarify the local government costs and benefits; otherwise "it will not be possible to get any valid indication that these costs will be met."

Rowe said the Corps' restudy should consider the "conflicting needs of a broad and diverse area and give full weight to the desirability for protection for as long as possible of the river in its natural state." Thus he seems to have moved close to a position strongly urged by brother Charles: Don't build the dam now, but keep all options open pending better definition of future needs. (Charles likes to relate that Josiah bought a canoe some time ago and has been using it on the river. "I don't know if he figures the Rappahannock will not be here long or if he's developed a genuine interest in canoeing.")

The lesson from Salem Church is that only the public itself, in the region where the decision is being made, can effectively challenge a project proposal and force a full dialogue on alternatives. One frequently advocated solution in such environmental imbroglios is to plan for all the needs of a broad geographical area, with all affected parties and governments participating. In the case of Salem Church, this would have meant planning for the whole Rappahannock River basin as a unit.

Meanwhile, the Corps is expected to finish its restudy this fall. A 240-foot dam is now estimated at over $100 million; the benefit-cost ratio is believed to be well below 1.7 to 1. Conservationists now predict the Corps will recommend a 230-foot level dam.

The next move is up to the Corps.

Fredericksburg editor Charles Rowe (left) opposes the dam while brother Josiah, the mayor, is for it. Yet Josiah recently bought himself a canoe.

By Paul E. Desautels

Royal family of gems holds court at Smithsonian collection

As covetous viewers soon discover, all that glitters is not diamond. Gemstones range the alphabet from amethyst to zircon

Mrs. John A. Logan recently donated her 423-carat sapphire (in case) to the Smithsonian. Shown at right at about 1⅓ actual size, the stone was found in Ceylon. Now named the Logan Sapphire, it is set amid 20 diamonds totaling 16 carats.

There was a pleasant, informal but impressive gathering this summer in the Gem Hall of the Smithsonian Institution's National Museum of Natural History. Dignitaries and friends of Mrs. John A. Logan had gathered to celebrate an extraordinary new addition to the museum's superlative collection of gems. Mrs. Logan had decided to entrust a famous sapphire to the keepers of the Hope Diamond and other treasures.

Her magnificent Ceylon sapphire, weighing 423 carats, is most likely the largest gem of this coveted rich blue color known. It is ideal for the Smithsonian display collection—where it now sits resplendent in a showcase of its own—not only because of its overwhelming size and great beauty but just because it happens to be a blue sapphire.

In 1884 Professor F. W. Clarke established the Smithsonian gem collection, when he prepared an exhibit of precious stones from America as a part of the Smithsonian Institution's display at the New Orleans Exposition. There have been many new expositions and new gems for the collection in the years since that event. Meanwhile the scope of the collection has also broadened from American to worldwide gems, and the range of species and varieties has expanded enormously. Extremely rare and costly gems suitable for exhibition still, as always, lie beyond the Institution's slim financial resources but important donations, such as the recent one by Mrs. Logan, have helped bridge the gap. Thus the celebration this summer.

Since 1884, there has gradually been accumulated in the Gem Hall of the National Museum of Natural History, and belonging to the people of the United States, the most magnificent collection of gems in the world. Diamonds, rubies and sapphires are its stars (the collection still lacks good emeralds). Much of its real importance, however, lies in the sparkling wealth of "other" gems. Professor Clarke established the general idea in the beginning that not just a few but many

Rosser Reeves Star Ruby, shown at about 1½ actual size—138.7 carats—is called finest of its kind.

Renowned Hope Diamond (slightly enlarged) was probably cut from stolen French Blue of Louis XIV, which came from India.

Pink sapphire of 19.9 carats (2½ actual size) is same species, corundum, as ruby. But only rubies are red.

Quartz, varied in color, includes rock crystal, amethyst and citrine like this 69.5-carat Brazilian stone, 1½ actual size.

Four stones of beryl, about ½ actual size, show color range. Upper stone is 578 carats. Emerald is a beryl, green from chromium.

Tourmaline, a complex silicate, has many subtle hues. This variety is a 28.2-carat rubellite from Brazil, twice true size.

kinds of gems are worthy of note. This has been an informal but guiding philosophy for the collection since then and, as a result, the collection has become a good place to strike up an acquaintance with the glittering variety of the gem kingdom.

Of all gems the big four—sapphires, diamonds, rubies and emeralds—are uppermost in the public mind and the most respected species in the jewelry and gem trade. All other known gems are relegated to lesser positions in the hierarchy of which diamond is undisputed king, and ruby, sapphire and emerald are the royal coterie (see samples on preceding pages). All are extraordinarily hard and durable. All have considerable beauty either because of their color or fire. All are relatively rare but not so rare as to prevent procurement of sufficient supplies for a stable market. For these and other reasons, all four inspire special awe, respect and a craving for ownership. The rest of the gems definitely tend to be less well endowed by nature in at least one of these desirable characteristics.

Hope Diamond has private vault

The Smithsonian collection includes a wealth of the most "precious" gems. The best known is the Hope Diamond glittering in all its 44½ carats of deep-blue beauty, secure in its own private vault and encrusted with legend. Its immediate neighbor to the left is the unbelievable 138.7-carat Rosser Reeves Star Ruby. Further to the left lies the great 330-carat Star of Asia sapphire (see cover), and across the room the 98.6-carat, rich blue Countess Bismarck sapphire in a necklace heavy with diamonds draws its share of public adulation. Unfortunately, dozens of other superb and very important gems in the display are often ignored in the glitter of the royal elite.

The earth's rock and mineral-making processes are numerous, complex, and have been operating since its birth. Even so, through all time a gemstone-quality piece of mineral material is rarely produced. In the earth we now suspect there are considerably fewer than 2,000 different mineral species. (This comes as quite a shock to someone like a systematic botanist who knows that of orchids alone there are more than 30,000 species.) Of these relatively few mineral species perhaps 100 at most occasionally occur in samples suitable for cutting into gems. This many are called, but only a few are chosen—perhaps 20—for circulation in the commercial gem trade.

To this group we may add 35 or so species which are sometimes cut into gems for the connoisseur and col-

The author is curator in mineralogy at the Smithsonian. His book, The Gem Kingdom, *will be published by Random House this fall.*

lector. The remainder of the approximately 100 species are of relatively low intrinsic value and are relegated to the role of ornamental or decorative stones.

What sorts of glittery things will you find among a jeweler's stock-in-trade if you search beyond the dazzling diamonds? One of the best-known gems there will be the aquamarine. Actually it is the same mineral species (beryl) as emerald, but it lacks the tiny trace of chromium which gives emerald its special color. The lovely bluish to greenish shades of aquamarine arise from the presence of traces of iron. Otherwise it has the same physical characteristics as emerald. As is true of all well-colored, transparent gems, the preferred cut for these gems is the "step" or "emerald" cut with its large, rectangular, flat facet on top opening a window to its internal color.

Amethyst will also be there, just one of the large family of quartz gems. Quartz—a very common mineral species—is cursed with so many gem names for an extraordinary number of color and pattern varieties that it is perhaps the most confused and confusing gemstone. Fortunately, most of the names eventually take their turn at disappearing into limbo, and only a few varieties achieve true gem status through common usage and force of their sheer beauty.

Topaz, stone of Sagittarius, has many colors besides yellow. The blue monster below is 3,273 carats, ¾ actual size. That above is twice size.

Citrine often misnamed

Citrine is a yellowish to golden to yellow-brown to red-brown variety of quartz that often finds itself ignominiously sold under such names as Brazilian topaz or even just topaz, thus confusing the buyer to the point of thinking he owns an entirely different gem. The buyer might also be horrified to know that yellow or yellowish shades are quite rare in quartz and that almost all citrine gets its color from careful heat treatment—between 500 to 600 degrees centigrade—of certain varieties of amethyst. But, the buyer may relax: Much of the best-colored aquamarine is tinted by the same sort of process.

Tourmaline will certainly be in the jeweler's showcase. Those who have heard of this species tend to associate it with the color green. It should be no surprise—but it always is—to find tourmaline gems in hues including pink, green, blue, yellow, brown, black and all sorts of intermediate shades. Chemically the mineral is a very complex borosilicate with a number of other elements combined in variable amounts, and its color may be different from mine to mine or even in the same deposit. Its primary attraction being color, tourmaline is another species seen most often in "emerald"-cut gems. It is somewhat harder than quartz and comes in a wider range of attractive colors, thus commanding more respect in the marketplace.

If a jeweler carries tourmaline in his stock he is also

This 28.8-carat Burmese apatite, shown at 2½ times actual size, is from the Isaac Lea Collection, the Smithsonian's first large acquisition of gems.

quite likely to have topaz. By far the great bulk of gem-quality topaz mined is colorless. With no particularly attractive qualities, this topaz is seldom cut into commercial gems. But some topaz is found in rich sherry and muscatel shades or even with blue, bright pink and reddish-purple tones. Heat treatment of certain pale yellow or brown stones can also produce good pinks or blues which resemble aquamarine color. Among the wide range of topaz gems in the Smithsonian collection is a magnificent blue one weighing 3,273 carats, but in size, if not in attractiveness of color, it is topped by a 7,725-carat soft-yellow topaz.

Of the faceted gems one other, zircon, should certainly be on display. Zircon has such satisfactory brilliance and fire that, in its colorless variety, it is used as a diamond substitute. Yet zircon, in spite of its low resistance to chipping and scratching, can be a gorgeous gem material in its own right, especially in its heat-treated gold or blue varieties.

Turning from the jeweler's faceted stones, to those traditionally cut as carvings or as round-topped oval forms called cabochons because the material lacks transparency, we will undoubtedly find jade, moonstone, opal and turquoise. Each of these four earns its commercial importance for different reasons.

Jade, often green but frequently found in a range of colors including lavender to yellow, has both beauty and durability. The superlative Maude Monell Vetlesen collection of carved Ch'ien-lung jades, plus a generous portion of other showpieces in the Smithsonian Gem Hall, show the potential and special appeal of this gem species.

Moonstone, too, is durable enough but its beauty arises not from color but from the mysterious bluish schiller or glow which it produces when well lighted. Opal, on the other hand, is hardly one of the more durable gems but its beautiful play of flashing, intense colors is unmatched in any other stone. Turquoise is so soft that it damages easily and tends to absorb discoloring impurities. Yet it offers one of the most attractive blues to be found among gem materials. Quite a bit of unimpressive off-color turquoise has been marketed just on the strength of its name which conjures up images of better things.

Jewels from living things

Finally our hypothetical jewelry shop would likely have three materials which are not technically mineral species—amber, coral and pearl—which stem from living plants or animals. Millions of years have been necessary to rob the ancient sap of certain plants of most of its liquids and gases to leave a fossilized resin we call amber and the Germans call *bernstein*—the stone that burns. It takes much less time for coral animals

Though not particularly hard, jade is tough and highly suited for carving. Orientals associate it with many cardinal virtues. Pieces above, from the Smithsonian's Vetlesen collection, are Ch'ien-lung period (1736-1795) of the Ching Dynasty. Jade's color may vary widely (below) from the usual green.

Another personal gift to the Smithsonian is this chrysoberyl cat's-eye, set in a lady's ring, with diamonds.

and pearl oysters to produce their gem crop, but this doesn't detract at all from their desirability. Synthetics, plastics and cultured pearls have wreaked havoc with the market for these life-produced gem products, but, nonetheless, the demand for the natural materials understandably persists.

So much for the catalog of a typical jeweler. He might have a thriving gem business thanks to such an impressive and salable display, but gem collectors would have to go elsewhere unless he stocked a few of the rather special limited-demand gems available to him now and then such as chrysoberyl, garnet, peridot, spinel and spodumene. Some of these are such desirable gems that their prices rank among the highest.

Garnet, which many people are so sure is purplish red and not unusually attractive, can be totally unlike the popular image and quite valuable. Actually a family of several mineral species, garnet occurs in many colors including grass-green to emerald-green. Demantoid, a green variety of garnet, has a brilliant luster, good fire and is at least as durable as quartz.

There are still other desirable green gems. Peridot is not as expensive as demantoid garnet (perhaps its color, shading from yellow-green to a sort of olive-green and its odd, somewhat glassy luster appeal only to certain tastes). For years it was known as "evening emerald," though it little resembles emerald.

Spinel in its red varieties sometimes resembles ruby and through the years has been regularly confused with it. Two of the world's most famous rubies—the Black Prince's Ruby and the Timur Ruby, both in the British crown jewels—are red spinel and not ruby at all. Most spinel is not red nor even of gem quality or color. Numerous fine gems of this species are available, however, in a remarkable range of colors.

An 880-carat spodumene

Spodumene seems to generate an even more limited commercial demand than spinel. The gem is normally colorless to yellow-green, but a very attractive lavender to magenta variety named kunzite—after the American gemmologist Dr. G. F. Kunz—has been found in Brazil and California. The Smithsonian's largest kunzite is an enormous but beautiful 880-carat gem from Brazil. Spodumene has a hardness approximately that of quartz, but it has a strong tendency to split or cleave under stress of a hard blow.

Now and then one of the very rare or very odd gems, known to connoisseurs and collectors, finds its way to the commercial market. Suddenly popularized by a change in fashion or because of availability of newly discovered material or even promoted by an advertising campaign, a gem can be forced to the attention of the general public. In recent years in Tanzania, a

deposit of a new gem species, zoisite, was discovered. An intensive advertising campaign by Tiffany's soon created a new market. Now known as tanzanite, bright sapphire-blue zoisite gems—of adequate durability for jewelry purposes—were excellent material on which to base such a promotion. The Smithsonian's collection sports one of the largest of these (a flawless gem of 122.7 carats) as well as a very rare tanzanite cat's-eye weighing 18.2 carats.

Most other gems have no commercial market. Perhaps like danburite, beryllonite, scapolite, petalite, pollucite and much euclase, they are colorless or nearly so and have no outstanding gem features. Like fluorite and sphalerite, on the other hand, they may have gorgeous color but be so soft and fragile as to be useless for wear even with the most careful protection.

Spodumene, though difficult to cut, delights gem collectors. The Brazilian stone above is an inch wide and weighs 68.8 carats.

For collectors only

Collectors recognize the rarity of mineral species of gem-cutting quality, whether or not they are beautiful or durable. After all, turquoise, opal and amber have made it commercially almost on the strength of their beauty alone. It is difficult, admittedly, to name a gem that has made the grade on grounds of durability alone. In any event, collectors think differently from commercial dealers and buyers.

For example, in 1944 a deposit in Minas Gerais, Brazil, yielded some superb, large gem crystals of a hydrous aluminum sodium phosphate previously unknown to science. It was named brazilianite. After scientific examination it was immediately obvious that it was too soft, too brittle, and was otherwise undistinguished as a gem material. The collector-connoisseur, disagreeing, treasures it for its good yellow to yellow-green color and its availability in large, clean transparent pieces.

Relatively rare, peridot is bottle green. Large stone—310 carats, about ¾ size—is world's biggest. It is from Egypt, the others from Burma.

Orthoclase is part of a common family of rock-forming minerals called feldspars, and moonstone is its most renowned gem variety. There is one other beautiful, transparent, golden-yellow variety found at Itrongay, Madagascar. Its barely satisfactory hardness, its disconcerting tendency to cleave, and its rarity excludes it from the company of commercial gems.

Very rare, and coveted on that basis alone, are sillimanite and taaffeite. Altogether there isn't a good, big handful of them taken together in all the collections of the world. Only one really good cut sillimanite is recorded (no, not in the Smithsonian), and less than a half-dozen taaffeites are known. Of course, the Smithsonian has the largest taaffeite (5.3 carats). Sillimanite is a problem for the Smithsonian. The finest gem is in London but we have an excellent crystal that could be cut into a superb large stone. It is just too good a crystal to cut and lose as a scientific specimen.

This kunzite, a spodumene, comes from California. The magenta specimen is 177 carats and appears slightly larger than actual size.

Many gemstones are too rare to be popular except with collectors. Those opposite are sometimes commercial stones; those on this page are for collectors only. At the right is a labradorite, a kind of feldspar, found in Oregon: 24 carats; 2½ actual size.

Sphalerite is brilliant and colorful, but too soft for jewelry. This 59.5-carat stone, ⅞-inch in diameter, was found in New Jersey.

Big merchant vessel, in a third-century-A.D.
relief, passes flaming lighthouse at Rome's port.

By Lionel Casson

After 2,000 years tours have changed but not tourists

Ancient Roman sightseers gaped at pyramids, griped about the inns and the guides and scratched 'Augustus was here' on statues

"In the second century of the Christian Æra the Empire of Rome comprehended the fairest part of the earth, and the most civilized portion of mankind." So begins Edward Gibbon's *Decline and Fall of the Roman Empire.* "The frontiers of that extensive monarchy were guarded by ancient renown and disciplined valor. The gentle, but powerful, influence of laws and manners had gradually cemented the union of the provinces. Their peaceful inhabitants enjoyed and abused the advantages of wealth and luxury."

Those were times, much like our own, when war was banished to the periphery, prosperity was widespread and conditions were ideal for extensive vacationing and sightseeing. To be sure, it took far more time than now, and the number who had the leisure and the funds cannot be compared with today's legion of tourists, returning this month from their summer vacations. But the tourist of, say, the second century A.D., the heyday of ancient travel, enjoyed much the same things and behaved much the same way as his distant cousin of today.

To begin with, Roman tourists were chiefly interested, just as we are, in the relics of man's past. We make the rounds of Europe's cathedrals; they made them of Greece's temples. We trek to where Washing-

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Built to withstand the centuries, Rome's splendid Appian Way stretched more than 350 miles.

ton passed a night, where Napoleon's house stood, where St. Paul was killed, where St. Peter was laid to rest; they trekked to where Alexander the Great slept, where Socrates lived, where Ajax committed suicide, where Achilles was buried. We make our way to famous galleries to view the great art of the past; they went to famous temples, because the temples of the ancient world doubled as art museums—as museums of all kinds, in fact, housing sculpture, painting, and objects of interest for natural history, ethnology, technology and just plain miscellany.

A temple in Asia Minor displayed barbarian clothing and elephant tusks. A temple of Apollo, god of healing, exhibited a special kind of dentist's forceps. At Rome you could see Caesar's sword, appropriately enough in the Temple of Mars, or, equally appropriately in a temple to the Goddess of Luck, the dagger that a would-be assassin tried to use on Nero.

Just as we are solemnly shown splinters of the True Cross, the bottles in which Lucrezia Borgia kept her poisons or the spot where St. Paul's head bounced, ancient tourists were shown the prow of Odysseus' ship, the crag to which Zeus chained Prometheus, the eggshell from which Helen of Troy was hatched (Zeus had visited her mother as a swan). Just as we go to Shakespeare country, they flocked to Homer country and the site of Troy. The standard tour included the shore on which the Greek ships were beached, the plain where Hector and Achilles rampaged, the tomb of Patroclus and the cave where Paris gave his fateful judgment. In Egypt they went to see the very things we do today: the pyramids, Sphinx, Valley of the Kings, and the many other testimonials of the Pharaohs' greatness.

Having settled on his itinerary, the ancient tourist decided whether to go by sea or by land. In most cases the choice was easy. He viewed sea travel as preferable to land as we do air travel to train; it spared him long scorching days in a jolting carriage or on shanks' mare. Since there were no regular passenger lines, he would make his way to the nearest port and patiently put up there until he found a freighter heading where he wanted to go.

His first choice would be any of the big merchantmen that hauled bulky commodities like grain and oil between distant ports. Running as much as 180 feet in length, carrying 1,000 tons of cargo and accommodating hundreds of passengers, they offered safety and, with their ample decks, relative comfort. Ancient freighters, even the largest, were equipped with only a handful of cabins for use by VIPs, friends of the owner or shipper and such; anyone else, including well-heeled travelers, took deck passage willy-nilly. Accompanied by one or more servants, depending on their wealth, they came aboard with collapsible shelters for sleeping quarters at night and provisions for the length of the voyage. The ship supplied only drinking water.

Since the sailing season was limited to the late spring, summer and early fall, and since the Mediterranean climate is comparatively mild, deck passage was usually no great hardship. Neither was the length of the voyage. With just ordinary luck, ancient sailing vessels could get from Naples to Alexandria in two weeks, from Naples to Athens in a week, from Athens to the west coast of Asia Minor in a few days. However, because of the prevailing northerlies in the eastern Mediterranean, the voyage home was a much

"Snack bar" of a first-century-A.D. tavern in Herculaneum has counter holes for wine jars.

slower business; from Alexandria back to Rome, for example, might take a traveler as much as ten weeks.

If his destination lay inland, the tourist came as near as he could by sea and then resigned himself to the rigors of the open road. During the first and second centuries, land travel was better than it was to be at any subsequent time until the coming of the railroad. Thanks to the Roman genius for road-building, there was a web of paved, all-weather highways linking the farthest corners of Rome's far-flung empire with the capital; rain did not mire a traveler for hours or days in a sea of mud, it simply made him wet.

Donkeys and mules pulled Roman carts

Those splendid roads marched along, mile after mile, over open desert, along the shoulders of ravines, up to and across mountain passes. Strategically placed along the main routes were inns or posting stations where travelers could hire beasts and vehicles, rent lodging and buy meals. The beasts were generally donkeys or mules (horses, expensive to maintain, were for the army or races). The vehicles varied from light two-wheeled gigs for fast travel to heavy four-wheeled affairs with arched leather or cloth canopies that looked very much like our Conestoga wagons. There was even a *carruca dormitoria,* a "sleeping wagon," the ancient equivalent of today's camper.

No carriage, light or heavy, offered a joyride since all had wooden wheels with iron tires and were innocent of springs. But the wealthy devised ingenious ways to mitigate monotony. The Emperor Claudius, who had a penchant for shooting dice, fitted up a carriage as a gaming room; the Emperor Commodus equipped one with swiveled seats, enabling him to catch the sun or a cooling breeze or merely to change the view; Pliny, compiler of the standard Roman encyclopedia of natural history, had room for a stenographer and his equipment.

Those who wanted to avoid being jounced about at all costs, and cared nothing about time or expense, used litters rather than carriages. The traveling litter was fitted with a canopy and draw curtains; the rider lolled on cushions in shaded ease as six or eight husky bearers plodded along, averaging 15 to 20 miles a day. Ordinary carriage travel averaged 25 to 30.

The rich arranged their itineraries so that they could either stay at their own country houses or be put up by friends or relatives; in case of need they could count on hospitality from local officials. In 112 B.C. a clerk in the foreign office in Alexandria wrote the mayor of an Egyptian town: "Lucius Memmius, a Roman Senator in a position of considerable importance and honor, is sailing [up the Nile] to see the sights. Receive him in grand style and see to it that, at the usual point, lodgings are prepared . . . and that the gifts, a list of which is attached below, are presented to him."

The commercial traveler or tourist of modest means had to take his chances at an inn. This offered the minimum in food and lodging and usually doubled as a house of ill repute. Here he would get a tiny cell of a room, which he might have to share with half a dozen others and which usually offered little more than a pallet, chair and chamber pot. Sometimes even some of these amenities were missing, as we gather from a message an irate guest scratched on the wall of his room in Pompeii: "Innkeeper," he wrote, "I urinated in the bed. I did wrong, I admit it. Want to know why? There was no mattress!" It stands to reason that there were minimal facilities for washing up, but that was no problem in Roman times, since every town of any size boasted one or more of those superbly equipped Roman bathing establishments which brought together under one roof cold plunges, warm baths, steam rooms and massage rooms.

Eating places, as we can tell from the many found among the ruins of Pompeii, Herculaneum and elsewhere, usually had a snack bar, a marble-topped counter, six to eight feet long, which ran parallel to the street. The surface of the counter was broken by the gaping mouths of two or three big clay wine jars; at its end there generally was a little charcoal-burning furnace to heat a water kettle. A customer could buy food or wine to take back to his lodgings or he could

Pont du Gard in southern France carries aqueduct on top and a road above lowest arches.

Roman road map copied here designated inns and "flophouses" by two- or one-peaked symbols.

stand in the street along with the usual clientele of sailors, muleteers, slaves and drifters and down his bread and sausage. Guzzling his drink and munching his meat, he could not have looked much different from any of us washing down a hotdog with swigs from a Coke bottle or coffee cup. The traveler who wasn't choosy about his dinner companions could walk through the shop to one or more tiny rooms at the rear, where table service was provided.

Whether at counter or table, he had to be on his guard to get his money's worth. The famous ancient physician Galen states bluntly that restauranteurs were not infrequently caught using human flesh in their so-called pork roasts and stews. Overwatering the wine was a widespread malpractice; the ancients always added a certain amount of water to their wine —only alcoholics took it neat—but the unscrupulous innkeeper put in more than the recipes called for. The Roman satiric poet Martial, who spent a fair amount of time in Roman wineshops, has a number of pungent epigrams on the subject, *e.g.*:

The rains this year left sopping wet
The grapes on every vine.
So, barkeep, don't you try to say
There's no water in your wine.
The other day down Ravenna way,
A barkeep did me wrong.
I ordered up a glass of weak,
And he makes me pay for strong.

Having completed the voyage to his destination, arranged for lodgings, satisfied the inner man and cleaned himself up, the ancient tourist was ready to sally forth and see the sights.

He stepped out of his lodgings more or less stripped for action. The photographic arsenal that is de rigueur today lay centuries in the future, and he was not even burdened with a guidebook. Not that this most useful form of literature did not exist. From at least the second century B.C., there were available such titles as *The Athenian Acropolis, Spartan Cities, Guidebook to Troy,* etc., and in the second century A.D. Pausanias, the Karl Baedeker of the ancient world, published an excellent and detailed *Description of Greece.* But these were for background reading; being handwritten on leather or papyrus like all ancient books, they were too valuable and bulky to lug around. As a consequence, the sightseer in Roman times was even more dependent on local guides than we are—and, from all we can gather, local guides have not improved much.

"The guides went through their standard speech," grumbles one character in a sketch Plutarch wrote about a group seeing the sights of Delphi, "paying no attention whatsoever to our entreaties to cut the talk short." A satirist prays fervently: "Zeus, protect me from your guides at Olympia, and you, Athena, from yours at Athens." It was not only that they never stopped talking; it was also what they talked about.

Four-wheeled carriage shown in relief may be a *carruca dormitoria*—an early Pullman.

"Step this way, ladies and gentlemen"

Guides had the weakness, traditional in their profession, of preferring a gaudy tale to sober information. They particularly liked to connect whatever they were showing with the heroic days of mythological times, to point out the very spot on the road where Penelope agreed to marry Odysseus, the very bones of a monster Heracles had killed, the very point on the beach where Aeneas landed, and so on. "Abolish fabulous tales from Greece," snickered Lucian, a satirical essayist of the second century A.D., "and the guides there would all die of starvation, since no tourist wants to hear the bald facts even for nothing."

The opportunity to see great works of art or his-

torical buildings is what draws a tourist to a site. Once there, however, he enjoys diversion, welcomes any variation from the standard round of visiting churches, museums and monuments. In ancient times as now, the locals had special performances to provide a change of pace for a footsore sightseer. One highlight of the tour of the pyramids, for example, was to watch men from a nearby village scramble up from the ground to the very tip—a real stunt in those days when the sloping faces, with all their original stones intact, were absolutely smooth. Farther up the Nile, priests had taught the sacred crocodiles to come when called and on command open their jaws and let their teeth be cleaned.

At one town there lived the crocodile-god Suchus. Tourists would bring him his appropriate food offering—a kind of pastry, some roasted meat and wine sweetened with honey—then stand and watch as the food was stuffed into the animal's mouth.

The wonderful talking statue

The greatest performance of all, however, was put on by nature and not man. At Thebes in Egypt, not far from the Valley of the Kings, stands a colossal statue consisting of a base, a throne and a seated male figure. We now know that it represents Pharaoh Amenhotep III, who reigned about 1400 B.C. The Greeks and Romans, however, preferred to believe it was a likeness of the mythological Memnon, child of the Goddess of Dawn.

Probably about 27 B.C. an earthquake broke the statue across the torso, and the upper part fell to the ground. The remainder developed a unique feature—the ability to utter sound. At daybreak—not any other time of day—it made a sharp cracking noise which resembled the snapping of the string of a musical instrument. The conviction arose, no doubt fostered by the local guides, that these sounds were Memnon's way of talking to his mother. There were some who looked for a rational explanation of the phenomenon, but they were voices in the wilderness. For the thousands who flocked there, the statue was actually talking.

They kept flocking right up to the end of the second century A.D. when it shut up. It was just about this time that the Emperor Septimius Severus replaced the fallen piece. It has been plausibly suggested that the sound was caused by the sudden increase of temperature at sunrise, expanding the air in the crevices of the broken surface. When the reconstruction covered up this surface, Memnon's voice was abruptly silenced.

We know of the Roman tourists' steadfast faith in the talking statue thanks to another characteristic that has not changed one whit during the course of centuries—the compulsion to scribble one's name in the

Jogging groom leads a light gig pulled by mules in this third-century mosaic from Ostia.

places one has been, to leave, as it were, a calling card for all subsequent visitors to see. We can trace this characteristic back to at least the sixth century B.C. In that year a pharaoh dispatched deep into the Sudan an expedition of Egyptian troops stiffened with a foreign legion, a contingent of Greek mercenaries. As the combined armies made their way upriver they passed the spectacular temple of Ramses II at Abu Simbel with its four colossal seated figures—all recently raised to the top of a cliff to avoid being submerged behind Egypt's Aswan dam. On the legs of the statues the commanding officers and some of the men scratched their calling cards. "Telephos of Ialysos [a city on Rhodes] wrote this," says one scratching; it was simply an ancient Greek soldier's way of saying "Kilroy was here." The monument that most roused the tourists' itch to scratch was Memnon. Their graffiti cover almost the whole of his legs and base. And they are by no means the work of ordinary folk. Some self-styled "pro-

"Restaurant" in Ostia has three shelves for food and wine. Behind is court for summer dining.

fessor and poet" scratched the following long screed in Greek doggerel verse:

Memnon knows how to talk and how to keep silence.
To move and to rest the tongue does he know.
At the sight of the dawn, of his saffron-clad mother,
He utters a sound that is sweeter I trow
Than the clearest of talk ever voiced by another.
This poem did Falernus, professor and poet, infuse
With a quality worthy of a Grace or a Muse.

The list of those who left their mark on Memnon includes eight governors of Egypt, three district governors, any number of army officers, two judges, a priest, and even the Emperor Hadrian himself; he had his name inscribed when he paid the marvel a visit in November A.D. 130.

Memnon, as Egypt's principal drawing card, boasts the greatest concentration of sightseers' graffiti. But there are plenty of others—in the tombs of the Valley of the Kings, on the Sphinx, the Pyramids, the walls of various temples. The land of the Nile is where the bulk of them is found. That is chiefly because the great tourist attractions in other parts of the ancient world—the Temple of Artemis at Ephesus, the statue of Zeus by Phidias at Olympia, the Colossus of Rhodes, and the like—have all disappeared.

Having visited the sights at a given place, witnessed whatever performances the locals had to offer and perhaps added his calling card, the ancient tourist was ready for that gratifying tourist activity, shopping.

Not too much information about ancient shopping is available, but it is enough to reveal that by and large only the objects of the hunt have changed, that the tastes, desires and purposes involved were much the same as now. The religious-minded Roman lady touring in Egypt brought back a container of Nile water to use in a service for Isis, just as the visitor to Rome today returns with a rosary. The amateur art-lover came home from Athens with a miniature of the great statue of Athena by Phidias, just as we come back from Florence with one of Michelangelo's David. Those who could afford it did not content themselves with miniatures; they ordered full-scale reproductions to adorn their town houses and country villas—a lucky thing for us, since the originals of almost all the great Greek masterpieces have disappeared and these copies are all that are left.

For those who just wanted a memento of a visit to a given place, there were appropriate cheap souvenirs, as we can tell from some specimens the archaeologists have dug up. In Afghanistan, for example, they found a glass vessel decorated with the scene of the harbor of Alexandria. Surely it was brought to that far-off spot by some local who, having made the long trek to the great metropolis, wanted a memento. From Puteoli, the resort and port just west of Naples, have come a number of examples of a typical tourist gimcrack—little glass flasks bearing a picture of the city's waterfront with the key sites identified by labels: "Light-

Travelers in an open cart are welcomed at a "motel" in this relief on a fourth-century-A.D. coffin.

house," "Nero's Pond," "The Oyster Beds," "Woods."

Very likely the ancient tourist shopped for locally available specialties as well, just as the visitor to England today looks for British woolens or the visitor to Rome for Italian silks. There certainly was temptation enough. Alexandria, lying at the end of the sea routes from the Far East and Africa, was middleman for all the exotic wares. Anyone visiting Egypt had to pass through Alexandria and, confronting him on all sides, would be irresistible buys in silks from China, cottons from India, spices from India and Indonesia, perfumes derived from African myrrh. The traveler to Syria could pick up Syrian glass or Near Eastern carpets and embroidered textiles. In Asia Minor he could get fine woolens and linens. In Greece there were the excellent fabrics woven at Patras. If he got no further than Athens, he could settle for a jar of the prized Mt. Hymettus honey.

We have only a few vague references to the shopping habits of the Greek or Roman traveler but they seem to indicate that he—or his wife—could no more pass up a bargain than we can. ". . . If my health improves," writes a Greek living in Egypt to a friend, sometime in the third century B.C., "and I go abroad to Byzantium [the modern Istanbul], I'll bring you back some fine pickled fish." Both tuna and turbot were caught there, and either made as welcome a gift to someone living in third-century-B.C. Egypt as caviar to a modern American.

There was one factor which must have held the shopper's enthusiasm somewhat in check: the customs charges. The Roman Empire maintained stations not only at all ports and frontiers but also at province boundaries, since duty was payable on goods crossing them. Beasts of burden, wagons, luggage containers and objects of personal use during the voyage were exempt. Everything else was dutiable—right down to corpses being transported for burial. On most items the rates were not stiff, only two to five percent ad valorem, but on such enticing things as silks, perfumes, spices, pearls and other exotic luxuries, it was a whopping 25 percent.

But then as now it helped to know the right people. "Send . . . a bathing costume as quickly as possible," runs a letter written to the secretary of the minister of finance of Egypt in 257 B.C., "preferably of goatskin or, if not, of light sheepskin. Also a tunic and cloak and the mattress, blanket, pillows and honey. You wrote me you were surprised that I didn't realize that all these items were subject to duty. I'm aware of it all right, but you are perfectly able to arrange to send them without any risk whatsoever."

By Frank Getlein

The legacy of Edward Hopper, painter of light and loneliness

Other painters of the American scene seem dated—but he, as his bequest to the Whitney proves again, speaks more truly than ever

A rare self-portrait in oil is among the surprises of Hopper's bequest to the Whitney Museum.

When Edward Hopper's wife died, a year after his own death in 1967, it was learned that they had bequeathed all of his works remaining in their possession to the Whitney Museum of American Art in New York. The gift consisted of more than 2,000 oils, watercolors, drawings, sketches and prints (some of which are reproduced in these pages), and was described by the museum's director as "an asset beyond valuation." The first public exhibition of any of the items in the bequest (at the Whitney from September 9 to October 24), though eagerly awaited, may not provide any revelations. But it does provide an occasion for renewed recognition and appreciation of a reputation that is already secure.

Edward Hopper was a giant among 20th-century American artists. He was also that rarest sort of artist, the one who really did go his own way, oblivious to the oblivion he was consigned to by an art establishment dedicated to what it considered the "mainstream" of its time, and drawing strength from his isolation. In a way his isolation as an artist was peculiarly appropriate to the nature of his art, for he was preeminently the painter of light and loneliness in the American city, offering as a contrast and counterpoint, mostly in his watercolors, the reality of light and elected solitude along the coasts of Cape Cod and Maine.

It was easy to miss—or dismiss—Hopper at almost any stage of his career. There was always something else going on that was regarded as the mainstream, and Hopper never quite fit into it, despite his affinity through at least two decades with what was widely regarded at the time as the central tradition of contemporary American art.

Hopper died so recently—May 15, 1967—that it is easy to miss the full scope of his artistic career. At his death his pictures could be seen in public and private

Light at Two Lights, watercolor (c. 1927), evokes "the light and elected solitude" of the Maine coast.

collections along with those of Robert Rauschenberg and Andy Warhol. But at the very beginning of his career he was artistically contemporary with John Sloan and William Glackens. He was the same age as, and briefly a fellow student with, George Bellows. He was ten years older than Grant Wood, a year younger than Walt Kuhn, both of whom now seem fixed at a certain point in the century, while Hopper, four years dead, speaks to us as movingly and as "relevantly," as we say now, as any young artist who grew up in the world of the Cold War and the ascendency of the Abstract Expressionists.

Born in 1882 in Nyack, New York, Hopper graduated from high school and commenced, at the end of the century, to study commercial illustration in New York. For half a dozen years he was at the New York School of Art, where he studied painting under the two most highly regarded teachers of the early 20th century, Robert Henri and Kenneth Hayes Miller. A few years later he moved to Washington Square, then the very center of the revolutionary art of the "Ashcan School." In 1913 he exhibited at the famous Armory Show, where he sold one oil, *Sailing,* his first and last sale for another decade.

At any rate, there he was—smack in the heart of the first exciting new art movement of a century which has turned out nothing but "new" art ever since. Yet, while his contemporary George Bellows moved easily into full equality with the older masters of "The Eight"—with Sloan, Henri, Glackens and the others—Hopper did not achieve such acceptance either in the art world or in the public view. He was present geo-

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graphically and he seemed to be present artistically, painting the same nonromantic, ordinary scenes of everyday life that were the hallmark of The Eight. But in his case nothing happened. Why?

We can see why more easily today than was possible then. The fact is that, despite surface similarities, Hopper was a very different sort of artist from any of The Eight. The heart of that group followed Henri from Philadelphia to Newark to New York, where they worked as newspaper illustrators, covering fires, political events, court cases, public celebrations and social events just as the news photographer does today. A great deal of this ebullient journalism—more, perhaps, than is generally realized—survived into their work, shaped it and gave it its distinctive immediacy, so vitally different from the accepted academic art against which they ranged themselves. Of all this there is nothing in the work of Edward Hopper.

A second distinctive characteristic of The Eight, by no means unrelated to the first, is the quality of the paint itself, which was put on, by most of them, in a highly traceable, bravura fashion. It was "juicy," especially in Henri, George Luks, Glackens, Everett Shinn and the junior member, Bellows. The manner of paint underlined the sense of immediacy and the drama that were rarely absent from the subjects and the points of view. Again, of this there is nothing in the work of Edward Hopper.

Discouraged by the lack of sales, Hopper retired from the scene from 1915 to 1920, earning a living at a commercial art that repelled him even as it supported him. He spoke, later, of agonizing in the street outside the offices where his clients awaited him, hoping that he would get an assignment because he needed the money and hoping that he would not because he detested the work and feared the time and energy it took away from his own art. It was at this time, too, that he took up etching, a very significant choice for one still unable to get his peculiar and personal vision across to his countrymen in paint.

A breakthrough at last

In etching, his experience was entirely different from his experience in oils. There is not that much difference in the work, despite the enormous difference in the two media. The subjects are similar and exhibit the same laconic point of view, austere refusal to present "human interest" in the journalistic sense of The Eight, and corresponding refusal to encase his vision in a bravura language. Yet he immediately achieved entry into the major print exhibitions, won a couple of prizes and began selling regularly.

The process is interesting because it is the exact reverse of more recent developments in the print field.

Standing nude, sanguine on paper (1923)—a drawing from the Whitney Studio Club's sketch class.

Artists like Jasper Johns, Andy Warhol and Roy Lichtenstein have abruptly become major printmakers as the direct result of their popular success as painters, and their prints, for the most part, faithfully reproduce the images that brought them painting fame.

With Hopper it worked the other way. After achieving recognition through his etchings and drypoints—about 60 of them from 1915 through 1923—he used that popular success to build a modestly successful career as a painter of watercolors, then oils. His first exhibition of watercolors at the Frank Rehn Gallery in the autumn of 1924 and his second, of oils, watercolors and prints in the winter of 1927, established Hopper as a presence on the American scene. He remained one until his death. In 1927, the year of that very modest acceptance and arrival, Hopper was 45 years old and had been practicing his art for a quarter of a century.

This print path to painterly recognition—perhaps

unique and certainly very rare in art—is of much more significance than the obvious explanation that etchings sell for lower prices than paintings do and therefore sell more readily. No, in Hopper's case, the mastery of prints was, among other things, a touching of bases with one of the prime sources of his humble, unpretentious art of the everyday scene and person presented without dramatic furnishings and simply for its own sake. That prime source is to be found in the etchings of Rembrandt. Besides his monumental achievements as primarily a portrait painter, Rembrandt invented the casual, ordinary landscape and he did so in the medium of etchings. It is not too fanciful to suggest that, in his eight years as a printmaker, Hopper returned to that tradition and from his practice of it established the legitimacy for his artistic vision that had so far been denied him in the institutional and public response to his paintings.

He gained his long-delayed acceptance, of course, just in time to be overshadowed by the twin ascendancies of the 1930s, the Americana of Thomas Hart Benton, John Steuart Curry and Grant Wood—from which he was disqualified by not being a Midwesterner—and the Social Realist painting of New York. With the latter, perhaps, he had certain affinities of subject, but he was disqualified on obvious grounds: The viewer of one of his paintings of lonely life in the city might indeed respond with sympathy for the people portrayed, but it would never enter his head that the ills of these people could be cured, or even touched, by any social program of any sort, from urban rehabilitation to full-scale revolution.

Following World War II, as the two dominant movements of the Depression years faded silently away, Hopper emerged as one of the authentic surviving artists of great merit of the first half of the century. But once more his reputation was overwhelmed by another of the great art fashions of our time, the Abstract Expressionism of the 1950s. As things looked from the viewpoint of 1955, Hopper belonged in the 1930s or even back in pre-World War I urban realism. Actually, as we have seen, he belonged in neither era,

Roofs, Saltillo, watercolor (probably 1946)—painted during one of the Hoppers' early trips to Mexico.

but Abstract Expressionism and the Ashcan School had a good deal more in common than members of either would be particularly happy to acknowledge. Beyond the very conscious and, as it were, deliberate Americanism of both phenomena, rejecting, as they did, the tutelage of Europe, both specialized in flashy and immediately attractive paint surfaces and both centered to a very high degree on the dramatic moment —the earlier group on a dramatic moment in life, the later on a dramatic moment in the career of the painter. Both characteristics were antipodal to everything Hopper stood for. His isolation endured.

The last time I saw Edward Hopper, a couple of years before his death, was at a New York art-crowd party. A museum person had moved into a new apartment and it was being "warmed." Hopper was not being warmed at all. Alone in the standing crowd, he sat on a low chair, his great hulk of a body rumpled and folded somewhat baggily. I squatted alongside and we talked, but his mind really was on something else—the passing waiters with their trays of hors d'oeuvres. He never missed one. A huge hand shot out and up, hovered over the tray, swiftly selected one or two items and brought them safely down to the lower level to be consumed at leisure before the next pass. This, he explained, would be his supper.

Hopper may have been the only man in the Western world who could eat caviar and stuffed mushrooms as a measure of frugality. That frugality, clearly, was a lingering survival from his early days of total lack of appreciation and hand-to-mouthing it. Although the Hoppers eventually traveled with some regularity and built a handsome studio at Truro for summers, the frugality remained in, for example, the spare furnishings of their Washington Square apartment with its potbellied stove—there not as a fragment of the past but as a working part of the wintry present. The frugal

Burly Cobb's House, South Truro, oil (probably 1930). This is typical of Hopper's Cape Cod landscapes.

All works on this and preceding pages: Whitney Museum of American Art, Edward Hopper Bequest

style of Hopper in life was precisely suited to the frugal style of Hopper the artist.

This is not a question of that classic value, economy of means, although Hopper had that, too. There is a plainness in his work that exactly suits the plainness of his subjects. The coastal watercolors are, to some degree, different, but even there, in the monumentally seen piles of New England houses, churches, facades and architectural superstructures, there is always the sense of the endless washing of light upon old well-scrubbed surfaces, plain surfaces put there by plain people. In the main line of Hopper's work, the oils of the city and its immediate environs and appurtenances, there is a presiding sense of frugality, of making do with the plain subsistence level of life. Hopper confined his view pretty much to urban people who weren't quite making it in the city, to people who, at an art-crowd cocktail party, might very well be chiefly struck by the quantities of food floating around.

The 20th-century American city has an external rawness about it that Hopper captured as no one has before or since. There are, as any reader of Ada Louise Huxtable well knows, a great many elegant buildings in New York. Hopper's own neighborhood, Washington Square, was until fairly recently one of the most delightful neighborhoods in the city. Hopper never looked at it. It wasn't his New York. His New York strikes the eye as Queens or Brooklyn, the West Side before it got renewed, the Bronx—never the classier parts of Manhattan. The raw, red brick buildings rise to five or six stories, never more, often fewer. In some ways his New York is a small town raised to infinity.

Solitary figures in a cage

In that infinity his people are trapped. His pictures, more often than not, are inside-outside pictures. We are inside looking out or outside looking in. In either case, very often, there is a solitary figure within his or (usually) her cage, contained by the walls, seeing or being seen from the outside, and, above all, picked out by, shaped by, the raw and pitiless light of Hopper's city.

The light. It is a major theme in all his work.

There are lights of all kinds in the history of painting: the fresh spring light of Botticelli, the lush summer light of the Impressionists, the clear light of Constable, the stage light of Caravaggio. The variations are endless, yet Hopper managed to create a light of his own simply by looking, patiently, at the light around him. His city light is as raw and ruthless as the raw brick buildings he celebrates. The light from the sky exposes the city and it exposes, in their loneliness and helplessness, the people in it.

It is unsparing in its revelations, cruel in that way. But it is, mysteriously, a sign of hope in the dim lives it lights up. A woman stands in the morning doorway, ravaged by the sun yet revived by it at the same time. A manicurist in a barber shop, without a customer and cut off from communication with the barber and his customer, who are almost out of the picture anyway, sits in the below-ground-level shop and takes nurture, before our eyes, from the bright sun which so pitilessly reveals her weakness, her aloneness. Like the Lord, whose name is blessed, the sun gives and the sun takes away, maintaining a moving balance in the lives of the poor people so compassionately illuminated in the city of Edward Hopper.

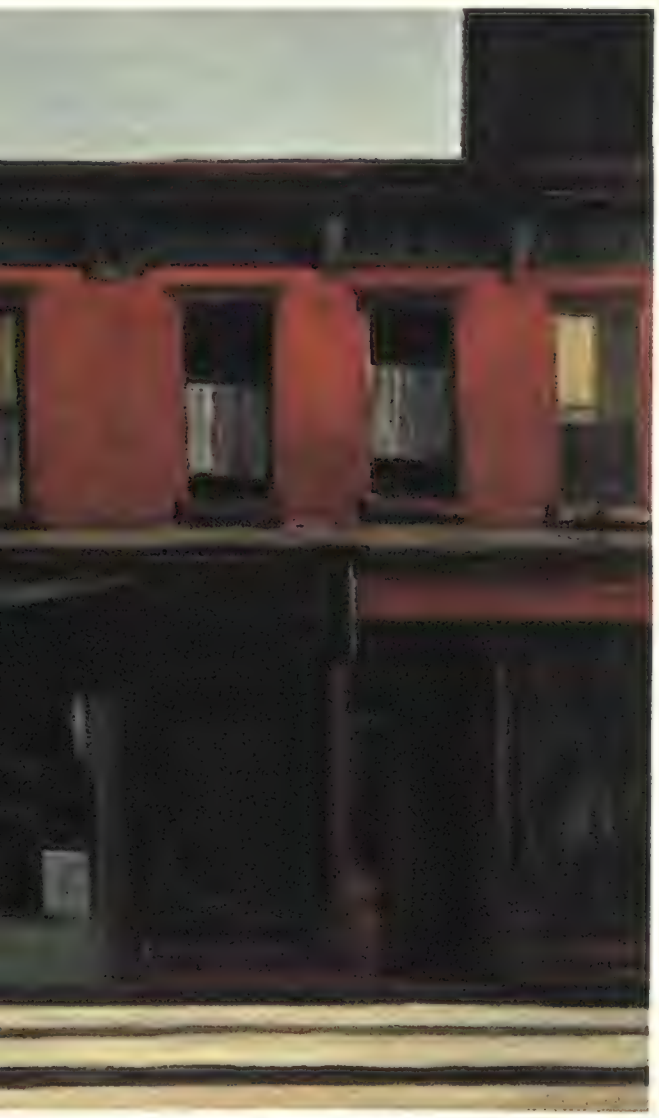
He died, finally, full of years and come into his own. With the breakup of Abstract Expressionism around 1960, the dominance of American art by a single style, manner, fashion or rhetoric was ended, at least for a decade or so. There has been no true ascendancy since. Pop, Op, Color Painting, Minimal Art, Conceptual Art, Earthworks, Techno-Art, Komix and a kind of magazine illustrationism writ large have scrambled for shreds of the once seamless garment. With no dominant doctrine to tell us how we have to see the world and its image in art, we are free again to see for ourselves. We have at last caught up with Hopper, who is now all but universally acknowledged to have been one of the giants of the century. Outside the sometimes hermetic world of art, the times, too, have caught up with Hopper.

He seemed plain beside the dash and

A classic Hopper, *Early Sunday Morning*, oil (1930), is characteristic of the artist's city paintings.

flash of The Eight, socially unconscious beside the social significance of the urban painters of the thirties, and just old-fashioned beside the urban pulse that many heard beating in Abstract Expressionism. But we now know there are people out there in that city—it is not just the thrusting rhythm of Franz Kline or the street-corner charm of George Luks; it is also a vast assortment of people, every one of whom needs some sort of place in the sun. This was Hopper's vision of the American city in the American light, and the rest of us have only just begun to see it with him.

The big show currently at the Whitney Museum of American Art is actually one final gift from the artist to the people. Typically, the bequest from which this show is drawn came to the museum with no strings attached, and the Whitney has already been attacked for plans to sell some of the material. But that gift will enrich a country already incomparably enriched by the work of an artist totally dedicated to its image.



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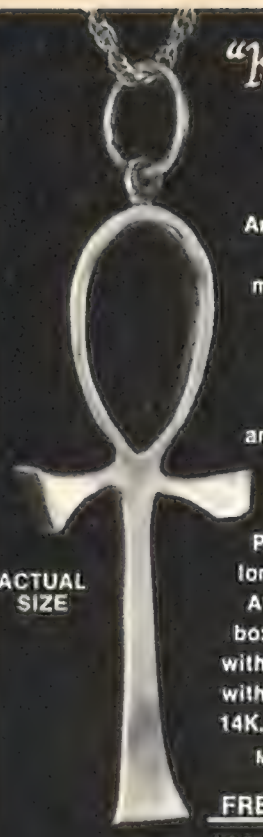

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Book reviews

The Lord's Woods
Robert Arbib
(Norton, $6.95)

The enchanted, ill-fated, Lord's Woods were located on Long Island, but they could have been anywhere. The author strikes a universal chord with the picture of his "green, gold, scarlet, multicolored wonder of a world, ancient and yet ever-changing, constant and yet filled with surprises, setting for dreams and fantasies, schoolroom without books, a sanctuary for birds and mammals, fish and crawling things, bugs and boys."

We have all conducted explorations and ramblings in such places, which survive only in memory. They have given way to the path of progress and profitability, and thus new generations and the world are much the poorer.

It is not yet too late to save the few slender shreds of wild nature that survive close to the homes of people or even to recapture fragments of real estate that have gone to other uses. Mr. Arbib's work contributes a sense of motivation toward this end, with his sensitivity, wisdom and passion for the varied life-forms and habitat that defy cultivation but make us civilized nonetheless.

He begins his adventures in the Lord's Woods as a nine-year-old. They were accessible, yet remote from the outside world, the very kind of environment Thoreau urged in the foreground of every settlement. Mr. Arbib guides the reader through the woodlands in all seasons, pointing out willows and spicebush and alders, grasses and ground clover, ferns and skunk cabbage, violets and ground ivy and mosses, each springing to life in the traditional procession and, as he notes, each a miracle.

Mr. Arbib is an expert on birdlife and offers fine descriptions of creatures on the wing. They were his companions in the process of growing up; to him and his boyhood chums, playing Huck Finn and Tom Sawyer, the woods were new-found America, enticing even at night when they could listen to tree frogs and spring peepers and insects screaming. He may be setting down some adult rather than juvenile reactions, but the birds come thoroughly alive in his pages.

Then comes the first invasion, a power line, claiming but five percent of the Lord's Woods but foretelling the inevitable and total disaster. This is the way with wilderness everywhere: The worst bite is the first bite, and no matter how the apologists minimize it the shock extends to all the rest, and the bigger bites are still to come. After the power line, follows the highway, complete with litter and fire and the developers attacking the last island of wilderness in a sea of rampant suburbia, until all is devoured and rendered "useful."

Mr. Arbib's eloquence evokes a heartfelt desire for a better world wherein birds, snapping turtles and owls hold a higher priority than bulldozers and power lines. But this cannot be realized as long as land is regarded as a commodity rather than a sacred trust. Enactment of the proposed National Land Use Policy Act may be a significant step forward, but we already have a myriad of laws and agencies that do not work.

The answer lies in the involvement of concerned citizens. Long Islanders, Mr. Arbib relates, failed during the 1950s to establish a wildlife preserve in the Lord's Woods. Americans presumably are more mature, more seasoned for the fight now. The Lord's Woods, everywhere, demand the effort, and they deserve it.

—Michael Frome
Conservation author and columnist

Patriotism in America
John J. Pullen
(American Heritage Press, $6.95)

This "Study of Changing Devotions 1770-1970" opens with two quotations: "Our Country! In her intercourse with foreign nations may she always be in the right; but our country, right or wrong!"—Stephen Decatur, 1816, which once ap-

peared above the editorials in the *Chicago Tribune;* and "Anyone who says patriotism is 'my country right or wrong' ought to have his head examined."—Jane Fonda, 1970.

Pullen's definition of patriotism should find few dissenters: ". . . It probably cannot be defined in a way that will satisfy everyone, but the events of May to July, 1970, added to others in our history, have almost dictated a definition: *love of country and readiness to act in its best interests as indicated by individual conscience and judgment.*" This of course applies to crises in internal and international affairs in peace as well as in war. The book finally discovers that mass action derives from the spirit of individuals who collectively accept Decatur's view.

With broad research and dispassionate insight, Pullen proves that dissent is nothing new. He takes from President John F. Kennedy's intended speech in Dallas: ". . . For as was written long ago, 'Except the Lord keep the city, the watchman waketh but in vain.' " None but the Lord, it might appear, could satisfy everyone with our present commitments—major installations in 33 countries and islands; the draft; the unpredictable rise and tumble of the economy.

Dissent, indeed, is deep-rooted. From a Virginia mountaintop, Thomas Jefferson declared, "I hold it that a little rebellion now and then is a good thing, and as necessary in the political world as storms in the physical." Pullen adds, the recent uproars make ". . . nearly every American newly aware of a strong, deep, mysterious, and often divisive emotion: patriotism."

Pullen examines the "Why Me?" syndrome at length, quoting high authority on the necessity of a draft system. Said General Emory Upton in his classic *Military Policy of the United States,* ". . . Neither voluntary enlistments based on patriotism, nor the bounty, can be relied upon to supply men for the army during a prolonged war."

Much of today is history as encore, woefully. The northeastern states all but rebelled against the War of 1812; the New York City Civil War draft riot left 1,000 dead. Mr. Pullen relies on facts; his writing gleams, and anecdotal material is wisely chosen. The times would demand that the book be widely read, because the soul of America is brought into revealing light.

—Scott Hart
Author of *Washington at War*

Bioethics: Bridge to the Future
Van Rensselaer Potter
(Prentice-Hall, $5.95)

Bioethics, a new term, has been coined by the author to define his position that ". . . The science of survival must be built on the science of biology and enlarged beyond the traditional boundaries to include the most essential elements of the social sciences and the humanities with emphasis on philosophy in the strict sense, meaning 'love of wisdom.' " Bioethics is to emphasize the combination of biological knowledge and human values.

The author is a distinguished biochemist and student of cancer cells who, like many other biologists, has become gravely concerned about our environmental problems and the very problematical chance of human survival. Like myself, he sees a necessary step toward survival to be a frank acknowledgment that science involves questions of human values, which may be illuminated by reference to their biological origins.

Of the 13 chapters of the book, nine have been previously published as independent articles, so there is considerable repetition in the development of Potter's ideas—also a certain lack of logical development and coherence. Yet each essay provides a significant new line of thought leading up to the summation of views in the last three chapters. These are: "Science and Biological Man," "Biocybernetics—The Key to Environmental Science" and "Survival as a Goal for Wisdom."

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by S. Dillon Ripley

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Mr. Ripley points out while education is serious and perhaps not fun, museums are educational and are *fun.*

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Early chapters explore our quest for order and organization, propose a "Council on the Future" to cope with the gulf between scientific knowledge and political direction, and reach the theme of the biocybernetic, or negative feedback, aspect of individual and social life. Here, Potter says, lies the root of the adaptive process. The quest for an optimum environment involves adaptation not to fixed conditions but rather to an environment with optimum range and frequency of change.

In his final chapters, Potter raises basic questions: What are the priority problems of our time? How can biology in the future alleviate human suffering, satisfy human needs and build human satisfaction? Biocybernetics is conceived to permit a resolution of the differences between the ecological and the economic points of view. The need to identify survival parameters is stressed, and zero population growth is picked out as a necessity. Finally, Potter calls for the organization of humanistic biologists into groups devoted to interdisciplinary scientific research and development, with the aim of promoting human survival. The development of a bioethical credo to guide action in matters affecting human mortality, random suffering and the future of man is deemed important.

The book is clearly aimed at a major problem: our adjustment to our frenetic, civilized and despoiled environment. It speaks practically and sensibly of many important factors in the relationship of present-day biology to social evolution, and possibly progress; but the style is plain, even prosaic, like that of most modern scientists writing their reviews and scientific papers. It lacks the fire of eloquence that may be necessary to evoke interest and carry conviction beyond the biologists who will constitute a far too limited circle of readers.

The author has neglected to provide any specific treatment, or indeed scarcely a mention, of biological warfare, genetic manipulation and eugenic programs, the control of behavior by means of drugs or the saving and lengthening of human life in an already overcrowded world.

With all Dr. Potter's emphasis on the environment, his treatment of ecological matters is thin, and his illustrations are drawn almost exclusively from the physiological and biochemical aspects of metabolism. Too little is to be found in these pages regarding the major problems of bioethics, which I take to be the threats of war and tyranny *as well as* overpopulation, exhaustion of resources and pollution. After all, 1984 is now very near.

—*Bentley Glass*
Vice-president, State University of N.Y., Stony Brook

The Stream
Robert Murphy
(Farrar, Straus & Giroux, $6.95)

Robert Murphy was for 20 years an editor of *The Saturday Evening Post*—his style is slim, clean, warm and friendly. Bob Hines' lovely woodland drawings captivate the eye and capture the heart. This fine artist illustrated Rachel Carson's *The Edge of the Sea.*

The Stream, like Robert Murphy's other books *(Peregrine Falcon; The Pond; Mountain Lion),* is admittedly ecological. A clear rivulet meanders through a 2,000-acre woodland tract—last safe haven for the wildlife that has taken sanctuary against developers.

The story unfolds through the eyes of Jerry Ohlmstead (one cannot miss the name's kinship with "homestead"), a near-militant conservationist. Ohlmstead draws solace from the wilderness he shares with owls, bears, woodcocks, bandit-faced raccoons—and a huge, elusive trout. He considers the protection of the area and its creatures no less than a sacred trust.

But it is the animals who star in daily life or death struggles that both captivate and chill. It is nature's own world they see, and the balance of nature sometimes rests cruelly on an imbalance of force.

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In one scene a bear tries to scare a weasel away from a rabbit: "He dropped the rabbit . . . and screeching with rage, his eyes glowing green . . . he leaped for her throat . . . her rising paw deflected him upward . . . she flipped him up, her jaws closed . . . his screeching stopped."

And there is the growth of a young horned owl. Finally he takes wing, learns to hunt. But hunger makes him careless—he dives on a reptile: "It was a big black snake following a mouse trail, and his talons went around it instead of through it. . . . In a flash the snake had a coil around him and as swiftly began to tighten it and attempt to throw a second coil. . . . His grip around the snake's neck was choking it but not quickly enough and the coil was crushing him. Horned owls kill with their feet, but in his extremity he began to bite at it desperately, and, more by luck than by design, bit its head off. The coils relaxed and he got out of them to stagger off a little way and sit panting . . . for a long time before he came back to the snake and ate it."

Finally, thanks to the awesome greed of man, there is the melancholy death of the great old trout: "He had eaten a great deal of insecticide and the fungus had spread and crept inexorably inward. . . . His long reign was over."

An oil company, secretly buying rights-of-way, finally defeats Ohlmstead. But the reader knows there are other battles that can yet be won.

—*William Childress*

Magazine writer and prize-winning poet

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"No-Tour" Tour: New York to Frankfurt—July 3-24.

King Arthur's England—July 12-August 2.

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"No-Tour" Tour: Dulles airport to London—September 11-October 2.

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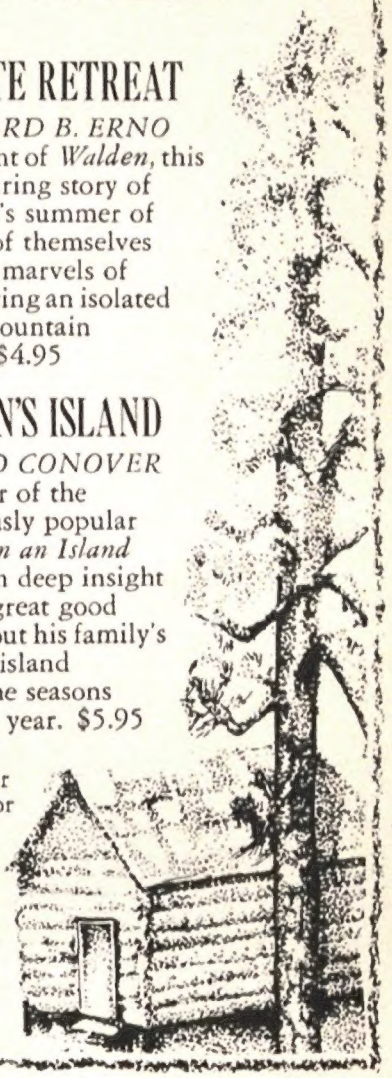

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Smithsonian highlights

The 125th anniversary of the Smithsonian Institution (see "View from the Castle," p.6) will be celebrated on September 26 on the Mall beginning at 4:30 P.M. with a band concert and followed at 5:00 P.M. by speakers including the Honorable Warren E. Burger, Chief Justice of the United States. There will also be a presentation of the Langley Gold Medal. The museums will all hold open house from 6 P.M. until 9 P.M. with special exhibits, films and lectures. An exhibit of Smithsonian memorabilia will open September 27 in the Smithsonian Institution Building.

Freer Gallery of Art
"Eugene and Agnes E. Meyer Memorial Exhibition" includes Chinese and Japanese bronzes, jades, sculpture, paintings and ceramics. Many of the 37 objects have not previously been exhibited.

Museum of Natural History
"Spiders" is an exhibit, prepared by Ann Moreton, of photographs, specimens, some live spiders and web transfers with information on spider lore. (See SMITHSONIAN, August 1971.)

"Korean Village" compares the traditional with the modern way of life in a Korean village, including artifacts and photographs from a recent expedition by the Smithsonian's Dr. Eugene Knez, associate curator of anthropology. Will open in mid-September.

Arts and Industries Building
"Apollo Photography" exhibit will feature samples of lunar-surface and command-module movie, still and television cameras like those used in the Apollo program with photographs taken by them. It includes lenses and the light meter used on the Apollo 11 command module.

Stereoscopic closeup photographs taken on the lunar surface are on display with a camera identical to the one used to take the pictures.

The Apollo exhibit includes a flightweight, operational, back-up Lunar Module and the largest lunar sample remaining from Apollo 11. Space suits worn by the Apollo 11 astronauts are on display.

National Collection of Fine Arts
"Boris Anisfeldt" exhibit includes watercolors and drawings by this artist who is best known for his ballet and opera designs. Opens September 20.

"Hidden Aspects" is an exhibition of diverse treasures belonging to the National Collection but not usually on view. (See SMITHSONIAN, July 1971.)

"American Master Prints" is a survey of three centuries of graphic art in America from the Smithsonian collections. Closes September 12.

"Romare Bearden: The Prevalence of Ritual" presents 56 works including collages by this contemporary black artist.

National Portrait Gallery
"Portraits of the American Stage: 1771-1971" presents 100 portraits of and costumes worn by personalities figuring in the history of performing arts in the United States. Opens September 11. (See article on p. 18)

" 'A Glimmer of their Own Beauty': Black Sounds of the Twenties" focuses on blues, jazz and poetry with a period jukebox, films and readings reflecting black life in the twenties.

"Portraits by Winold Reiss," used to illustrate *The New Negro* by Alain Locke, depict the central figures who contributed to the Harlem Renaissance.

Division of Performing Arts
"The Waywardly Wandering Wagonful of Banjo and Jack," created by the Allan Stevens company, is featured at the Smithsonian puppet theater. The show includes 19th-century folk songs and stories. Daily, Wednesday through Sunday, Museum of History and Technology.

Museum of History and Technology
"The Black Ships" is a Charles Eames film showing artifacts of the journeys of Commodore Perry, including the opening of Japan.

"Slovenes in America: An Instance of Cultural Impact" includes artifacts and photographs reflecting the religion, society and home life of Slovenes and their influence on the American way of life.

Traveling Exhibition Service
Elmira, New York — "Contemporary American Black Artists" (Elmira Art Gallery, September 4-October 3).

San Francisco, California—"Prints and Drawings by Lovis Corinth" (De Young Museum, September 18-October 17).

Austin, Texas—"Dante, The Divine Comedy" (St. Edward's University, August 28-September 26).

Deland, Florida—"Easter Island" (Deland Museum, September 4-26).

Colorado Springs, Colorado—"Indian Images" (Colorado Springs Fine Arts Center, September 4-October 3).

Kansas City, Missouri—"Vanishing Totem Poles of Alaska" (Kansas City Museum of History and Science, August 28-September 26).

Portales, New Mexico—"Discovering Color in Nature" (Eastern New Mexico University, September 4-October 3).

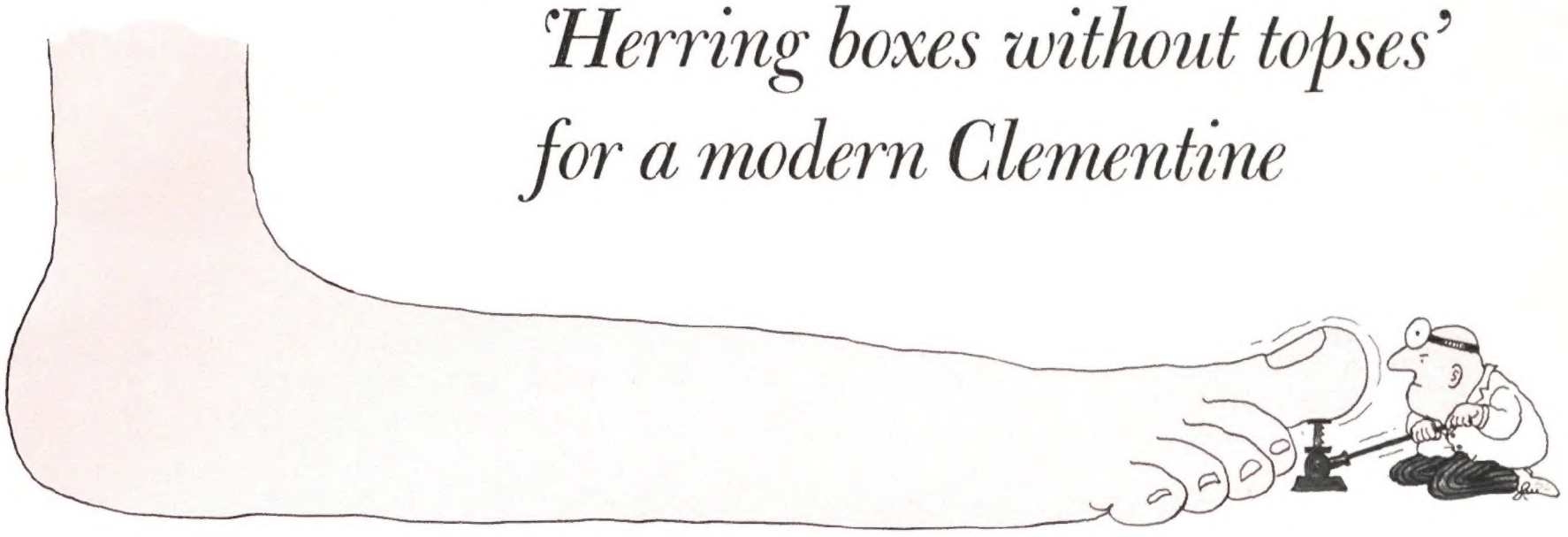
Minneapolis, Minnesota—"Norway Now: 11 Painters" (American Swedish Institute, September 11-October 10).

Anacostia Neighborhood Museum
"Man's Greatest Adventure" is an exhibit illustrating the contributions of the black man to science in America.

Smithsonian Commons
Luncheon facilities for staff, resident scholars and all members of the Smithsonian Associates are located in the original Smithsonian Building. Open weekdays from 11:30 A.M. to 2:00 P.M., the Commons offers a buffet luncheon from $1.25 to $1.75 upon presentation of a membership card.

By Patrick Ryan

'Herring boxes without topses' for a modern Clementine



Ever since *Homo sapiens* first decided to rear up on his hind legs for keeps, he's been complaining about his feet. The Ebers medical papyrus of the 16th century B.C. recorded remedies for ancient Egyptians having trouble with their aching dogs. Hikesios of Smyrna, a practicing podiatrist in 100 B.C., left for posterity his recipe for corn plasters.

Apocrypha holds that the pointed toe of medieval courtly footwear was contrived by a British nobleman to streamline his bunions. Capulet, when greeting guests at that ill-fated dinner dance, was only able to promise the visiting gentlemen as many partners as there were "ladies that have their toes unplagued with corns." Woodrow Wilson confided that, "When my feet hurt, I can't think." When a Gallup poll gloomily asked people what they found most to complain about, four out of five replied, "My feet."

The blame for this unending hell on the extremities could be divided between shoe-wearers and shoemakers. The cry "My feet are killing me!" could more accurately be transposed into "My shoes are killing my feet." Bunions and callouses have prospered exceedingly since comfort became second to appearance. Ask anyone who has lain temporarily supine beneath a restaurant table and viewed the ranks of metatarsal murderers kicked off every nyloned foot in the hostelry. In Dallas, Texas, during the winklepicker vogue of the 1960s, a doctor made a fortune amputating the little toes of wealthy women anxious to squeeze persecuted dogs into narrower fittings.

Female foot-masochism is also apparently forced on some by the manufacturers. The economics of mass production have driven the main body of shoemakers to produce their wares principally for the commoner sizes of feet, and to ignore those with hooves outside the average.

In Britain, a Member of Parliament, Mrs. Renée Short, is condemning this discrimination and campaigning for the toe-comfort of ladies with larger feet. "I take a broad 8½ size [American: 10½]," she has said, "and that's some foot, I can tell you. . . . If you have feet like mine, and plenty have, shopkeepers tell you to go to the men's department." And her complaint is supported by the Society of Chiropodists whose spokesman has confirmed that "there are few manufacturers who make shoes in adequate ranges although the size of the average foot has been increasing for at least 20 years."

Every available good wish must be extended to Mrs. Short and her budding Society for the Protection of Large Feet. If a wider market can be created for larger sizes of footwear, profit-hungry manufacturers will make more of them. It seems to have been accepted immemorially that small feet are synonymous with female beauty. A major public relations campaign is required to persuade the world that this is no longer so and that when it comes to feet, as to bosoms, "Big is Beautiful." Ladies with just average basal extremities must be brainwashed into believing that they are gracelessly under-endowed. And that elegance demands they conceal this shortcoming cosmetically by buying larger shoes than nature ordained.

The Cinderella story will have to be reversed so that the Ugly Sisters' minuscule pads were just too laughably underdeveloped to fill the size 12 glass canoe left behind in the ballroom. Copyright must be purchased of that scurrilous song and new recordings issued, with maximum payola, proclaiming that "Everybody loves you, 'cos your feet's too big.' "

Lists should be issued of such renowned lovelies as Garbo who, while walking in beauty like the night, also trod surpassing extensive. The memory should frequently be recalled of darling Clementine: "Light she was and like a fairy, and her shoes were number nine."

Future Miss World contests should be held with bags over the heads of the participants and all merit based on the total acreage covered by their two feet. And the power of romance could be brought to bear for the mutual benefit of wine and spirit merchants, if they sponsored a drive to convince our younger males that vastness of foot is a prime female sex attractant since, when courting a damsel so widely supported, you get a much bigger share of the bubbly when you drink champagne out of her slipper.

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